ORDER NO. AD8907243C8

Service Manual

Portable CD Player

SL-XP2

COMPACT disc DIGITAL AUDIO

DIGITAL

Color

(K) . . . . Black Type

Area

Country Code	Area	Color
(E)	Continental Europe.	(K)
(EB)	Great Britain.	(K)
(EG)	F.R. Germany.	(K)
(EO)	Switzerland.	(K)
(GC)	Third Region.	(K)
(GN)	Oceania.	(K)

■ SPECIFICATIONS

■ Audio

No. of channels: 2 channels (stereo)
Line output voltage: 1.0Vrms (50 kΩ) φ3.5
Frequency response: 20~20,000 Hz (+0.5 dB, −1.5 dB)
Dynamic range: more than 94 dB
S/N ratio: more than 96 dB
Digital filter: Quadruple oversampling
Phones output: max. 15 mW/16Ω φ3.5 (adjustable)

■ Signal Format

Correction system: Technics New Super Decoding Algorithm

■ Pickup

Type: Fine-focus, one beam
Light source: Semiconductor laser
Wavelength: 780 nm
Lens: Glass pressed lens

■ General

Power requirement: AC; with an included AC adaptor
Battery; with two "LR6" type batteries (DC: 1.5V x 2)
Rechargeable Battery; with the included Rechargeable Batteries; DC 1.2V x 2
DC IN: 3V ⊕—⊙—⊖ (mini jack)
Power consumption:
AC adaptor; 2 W
Battery; 0.7 W (DC 3 V)
Dimensions (W×H×D): 128×35×145 mm (5″×1⅜″×5¹¹⁄₁₆″)
Weight: 360 g (12.7 oz) with batteries

Specifications are subject to change without notice.
Weight and dimensions are approximate.

Technics

Matsushita Electric Industrial Co., Ltd.
Central P.O. Box 288, Osaka 530-91, Japan

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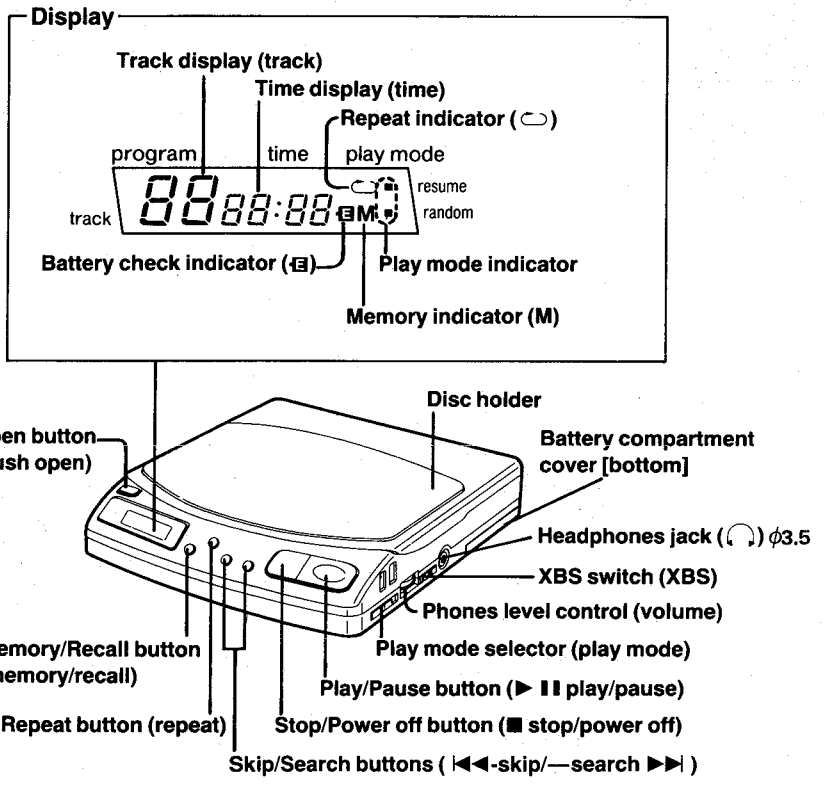
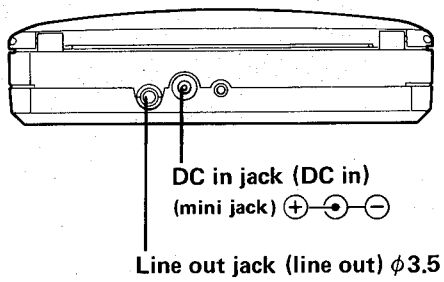
■ CONTROLS AND FUNCTIONS





■ ACCESSORIES

- AC adapter 1
  - SH-CDA6U-E : (E, EG, EO)
  - SH-CDA6U-EK : (EB)
  - SH-CDA6U-XB : (GC)
  - SH-CDA6U-XL : (GN)
- Rechargeable batteries . . . . . 2 [SH-CDB8-1]
- Stereo earphones (with remote-controller) . . . . 1 [RFEV100A0ZS]
- Strap . . . . . 1 [RFC0005]
- Stereo connection cable . . . . 1 [SJPD5-2K]
- AC plug adaptor . . . . . 1 (For (GC) area.) [RJP120ZDS-K]

■ PRECAUTION OF LASER DIODE

CAUTION: This product utilizes a laser diode with the unit turned "on", invisible laser radiation is emitted from the pick up lens.
Wave length: 780nM
Maximum output radiation power from pick up: 100μW/VDE

Laser radiation from the pick up lens is safety level, but be sure the followings:

1. Do not disassemble the optical pick up unit, since radiation from exposed laser diode is dangerous.
2. Do not adjust the variable resistor on the pickup unit. It was already adjusted.
3. Do not look at the focus lens using optical instruments.
4. Recommend not to look at pick up lens for a long time.

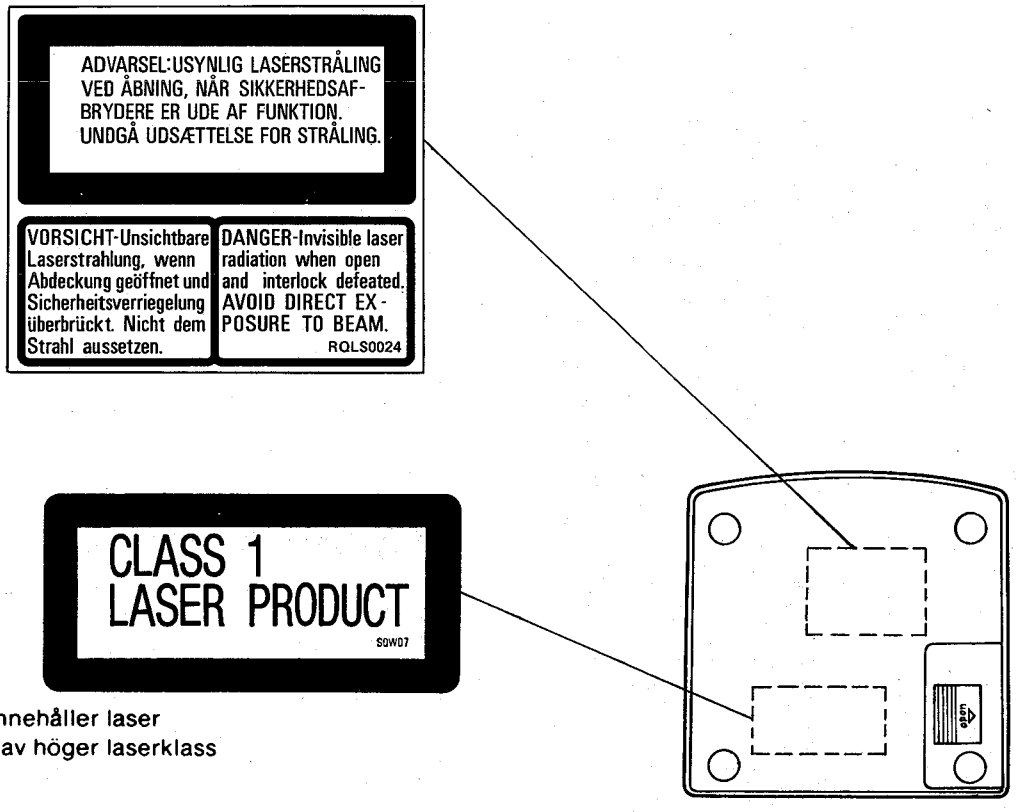
ACHTUNG: Dieses produkt enthält eine laserdiode. Im eingeschalteten zustand wird unsichtbare laserstrahlung von der lasereinheit abgestrahlt.

Wellenlänge: 780nM
Maximale strahlungsleistung der lasereinheit: 100μW/VDE

Die strahlung an der lasereinheit ist ungefährlich, wenn folgende punkte beachtet werden:

1. Die lasereinheit nicht zerlegen, da die strahlung an der freigelegten laserdiode gefährliich ist.
2. Den werksseitig justierten einstellregler der lasereinreit nicht verstellen.
3. Nicht mit optischen instrumenten in die fokussierlinse blicken.
4. Nicht über längere zeit in die fokussierlinse blicken.

ADVARSEL: I dette a apparat anvendes laser.


ADVARSEL:USYNLIG LASERSTRÅLING
VED ÅBNING, NÅR SIKKERHEDSAF-
BRYDERE ER UDE AF FUNKTION.
UNDGÅ UDSÆTTELSE FOR STRÅLING.
VORSICHT-Unsichtbare Laserstrahlung, wenn Abdeckung geöffnet und Sicherheitsverriegelung überbrückt. Nicht dem Strahl aussetzen.
DANGER-Invisible laser radiation when open and interlock defeated. AVOID DIRECT EX-POSURE TO BEAM.
RQLS0024
CLASS 1
LASER PRODUCT
S0W07

Obs:
Apparaten innehåller laser
Komponent av höger laserklass
än klass 1.

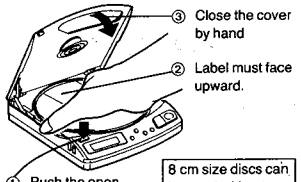
■ OPERATION

The following explanation is for a disc containing 7 tracks having a total playing time of 49 minutes and 58 seconds.

1 Normal play (To play a disc from the first track to the end of the disc)

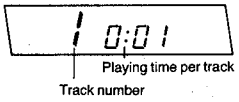
First, set the play mode selector to "normal" position. (The play mode indicator has no display.)

1. Insert a disc.



8 cm size discs can be used without adaptor.

2. Press the play/pause button.
   - The unit will be turned on and the disc will be played from the first track.

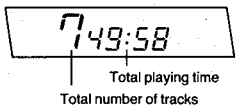


3. Adjust the volume.

First, turn down the level control of the unit or the connected audio system.

- To listen through stereo earphones or headphones, adjust the phones level by the phones level control of the unit.
  XBS switch (phones only)
  Set the XBS switch to "on" to boost the low freguency range.
- To listen through an audio system, adjust the output level on the amplifier or receiver.

4. To stop disc play, press the stop/power off button.
   - The disc will stop rotating, and the total number of tracks and total playing time will be displayed.



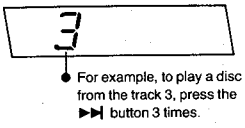
   - When all tracks have been played, the disc will automatically stop.

5. Press the stop/power off button again to turn the unit off.
   - The unit will be turned off automatically after about 5 minutes in the stop mode.

Notes:
- Always press the stop/power off button before opening the disc compartment to avoid possible damage to disc and/or the disc play mechanism.
- Set the unit to the stop mode (total number of tracks and total playing time are displayed) for Program play, make sure to press the stop/power off button after the track number is displayed.

2 Skip play (To start disc play from a specific track)

1. Press the ▶▶| button (skip/search) in the stop mode to specify the desired track.
   - Each time you press this button, the pickup will advance by one track. If you go past the desired track, return the pickup using the |◀◀ button.



   - To cancel, press the stop/power off button.

2. Press the play/pause button.
   - Disc play will start from the specified track, and continue to the last track.

■ Skip play during disc play

By pressing the skip/search button (|◀◀ or ▶▶|) during disc play or when disc play is paused, you can easily move the pickup to the beginning of the track being played or a track before or after it.

•Forward skip
Each time the ▶▶| button is pressed, the track number on the display will skip forward and disc play will resume.

For example, to skip from the track 3 to the track 5...

(Press the ▶▶| button twice.)

•Backward skip
If the |◀◀ button is pressed once, the disc will be played from the beginning of the track being played. Each time the |◀◀ button is pressed after that within no display of the playing time, the track number on the display will skip backward and disc play will resume.

For example, to skip from the track 5 to the track 3...

(Press the |◀◀ button 3 times quickly.)

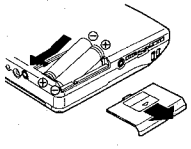
■ POWER SOURCE

This unit may be used with the included rechargeable batteries or two LR6 type alkaline batteries, the included AC adaptor or the optional car adaptor (SH-CDC6, optional).

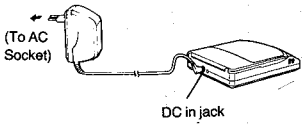
■ Rechargeable batteries operation

For its initial use after purchasing or after a long time interval (more than three months), make sure to recharge the rechargeable batteries. Normally 3 hours recharging will give approximately 2.5 hours play (at 25°C).

1. Open the battery compartment cover and insert the rechargeable batteries into the battery compartment, making sure that the proper polarities are maintained.



2. Close the cover and connect the AC adaptor as shown in the figure.

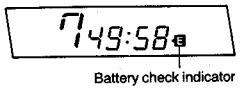


The shapes of the AC adaptor and plug may differ according to the area.

3. Disconnect the AC adaptor in about 3 hours.

- The unit can be turned on with the AC adaptor while the battery is being recharged. In this case, the recharging time will be longer than the specified time.

•Rechargeable battery life
This rechargeable battery can be recharged about 300 times. Over 300 times, its operation time will become shortened. That's time for replacing the rechargeable batteries with new ones (SH-CDB8).
- Battery condition can be checked by the battery check indicator on the display. When the batteries are weak, the battery check indicator begins to flash on and off, and then the unit will automatically shut off.



■ Optional LR6 type battery operation

Two LR6 type alkaline batteries can be inserted into the battery compartment in the same way as the rechargeable batteries.
- Battery condition can be also checked by the battery check indicator. The indicator begins flashing on and off at a half consumption of the battery life.
  Use of alkaline batteries will give approximately 4 hours play (at 25°C).

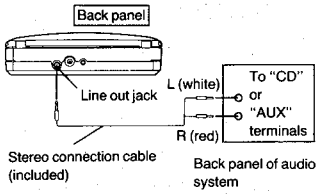
Notes:
- Batteries installed with incorrect polarities may leak and damage this unit.
- Do not mix batteries (old and new) or types (Ni-Cd, alkaline and carbon).
- If the set is not used for a long period of time or is used only from an AC power source, remove all the batteries for battery life and to prevent potential damage due to possible battery leakage.

■ CONNECTIONS

■ Listening through an audio system

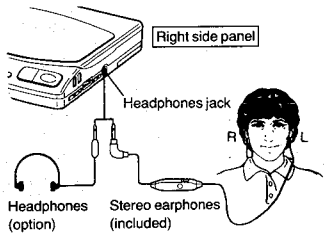
Use the stereo connection cable (included) to connect this unit to a receiver or a stereo cassette recorder.

- Switch OFF the power to the receiver or stereo radio cassette recorder before connecting this unit.
- Do not connect this unit to the PHONO terminals of the receiver or stereo radio cassette recorder.



■ Listening through the stereo earphones or headphones

Connect the plug of the stereo earphones (included) or headphones (option) to the headphones jack.

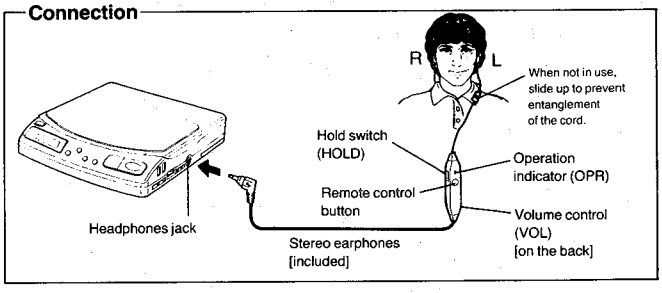


■ REMOTE CONTROL

The following operation can be performed with the included Stereo earphones, without pressing the operation buttons on the unit.

•play •stop •forward skip •volume control (phones level)

Connection

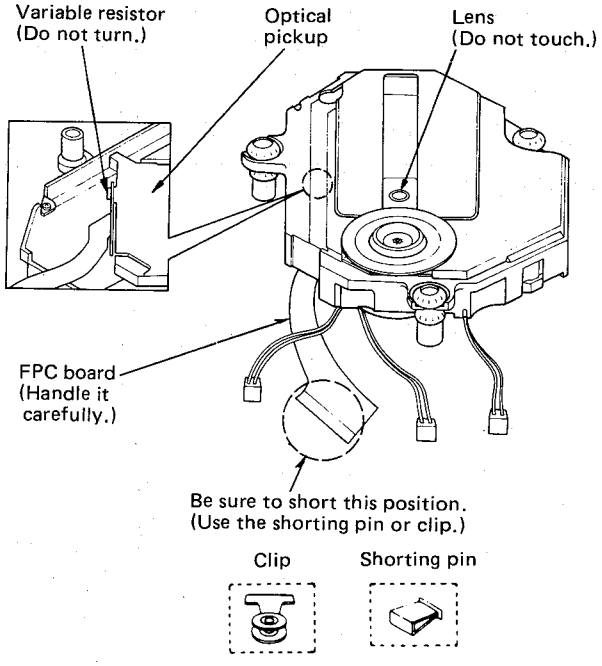


■ HADLING PRECAUTIONS FOR TRAVERSE DECK

The laser diode in the traverse deck (optical pickup) may break down due to potential difference caused by static electricity of clothes or human body.
So, be careful of electrostatic breakdown during repair of the traverse deck (optical pickup).

• Handling of traverse deck (optical pickup)

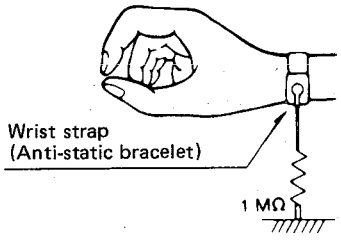
1. Do not subject the traverse deck (optical pickup) to static electricity as it is extremely sensitive to electrical shock.
2. To prevent the breakdown of the laser diode, an anti-static shorting pin is inserted into the flexible board (FPC board).
   When removing or connecting the short pin, finish the job in as short time as possible.
3. Take care not to apply excessive stress to the flexible board (FPC board).
4. Do not turn the variable resistor (laser power adjustment). It has already been adjusted.

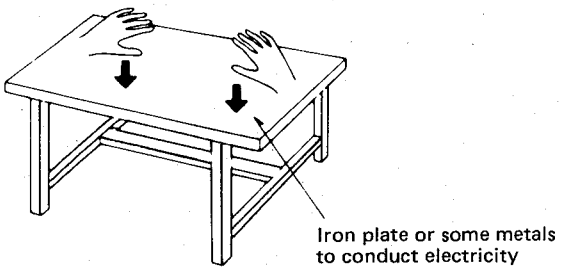


• Grounding for electrostatic breakdown prevention

1. Human body grounding.
   Use the anti-static wrist strap to discharge the static electricity from your body.
2. Work table grounding
   Put a conductive material (sheet) or steel sheet on the area where the traverse deck (optical pickup) is placed, and ground the sheet.

Caution:
The static electricity of your clothes will not be grounded through the wrist strap. So, take care not to let your clothes touch the traverse deck (optical pickup).





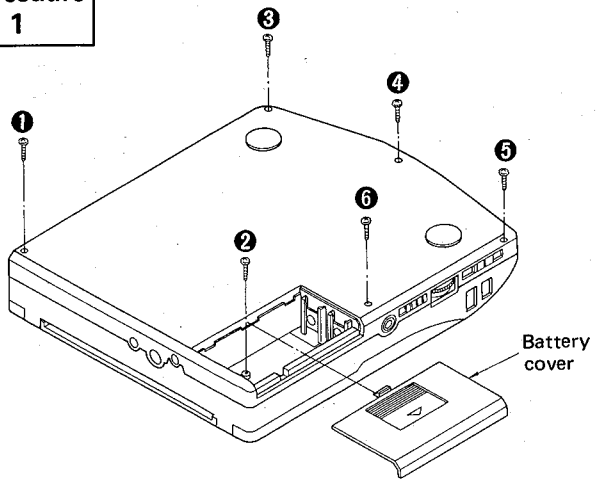
■ DISASSEMBLY INSTRUCTIONS

Warning: This product uses a laser diodes. Refer to caution statements on page 2.

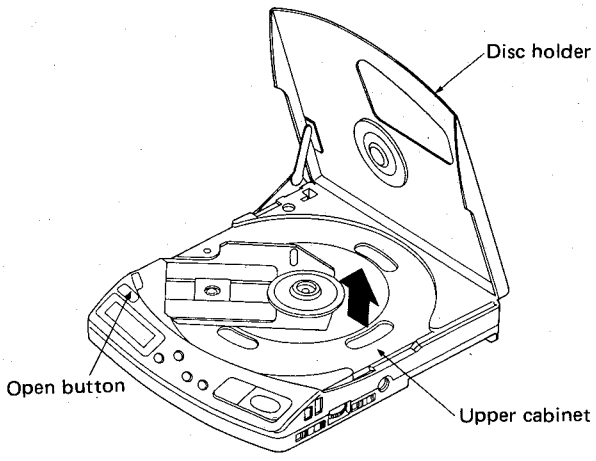
ACHTUNG:
- Die lasereinheit nicht zerlegen.
- Die lasereinheit darf nur gegen eine vom hersteller spezifizierte einheit ausgetauscht werden.

*** This CD player is equipped with FPC boards, so handle them with care during disassembly and reassembly.**

Ref. No. 1	Removal of the upper cabinet
Procedure 1	

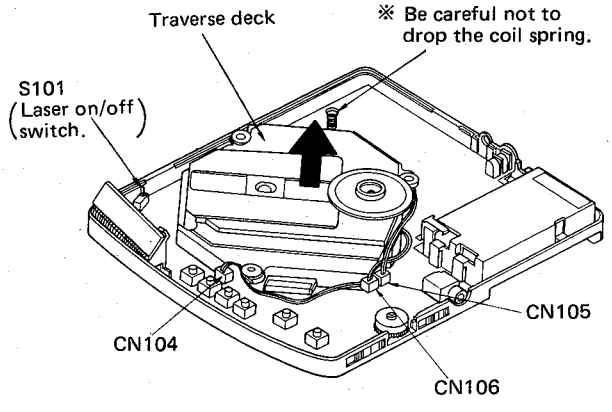


1. Remove the battery cover.
2. Remove the 6 screws (❶ ~ ❻).



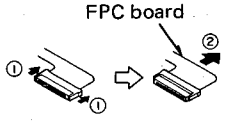
3. Push the open button and open the disc holder.
4. Remove the upper cabinet in the direction of the arrow.

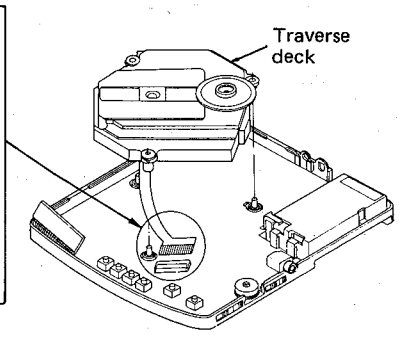
Ref. No. 2	Removal of the traverse deck
Procedure 1→2	



1. Disconnect the connectors (CN104, CN105, CN106).
2. Pull out the traverse deck in the direction of the arrow.

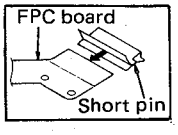
1. Push the top of the connector in the direction of the arrow ①.
2. Remove the FPC board in the direction of the arrow ②.





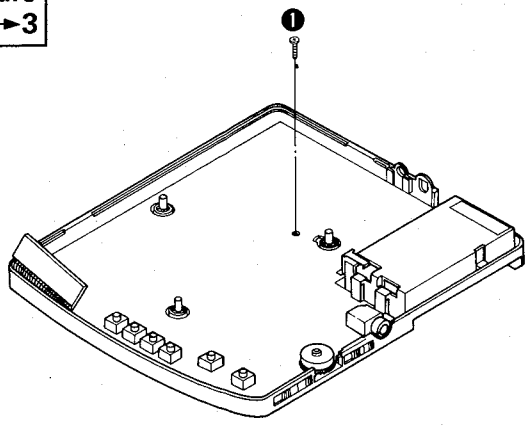
3. Remove the FPC board (CN103).

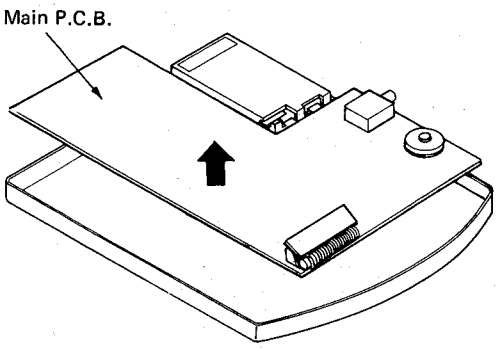
Caution:
Insert a short pin into the traverse deck's FPC board. (Refer to "handling precautions for traverse deck" on page 5.)



Ref. No. 3 — Removal of the main P.C.B.

Procedure 1→2→3

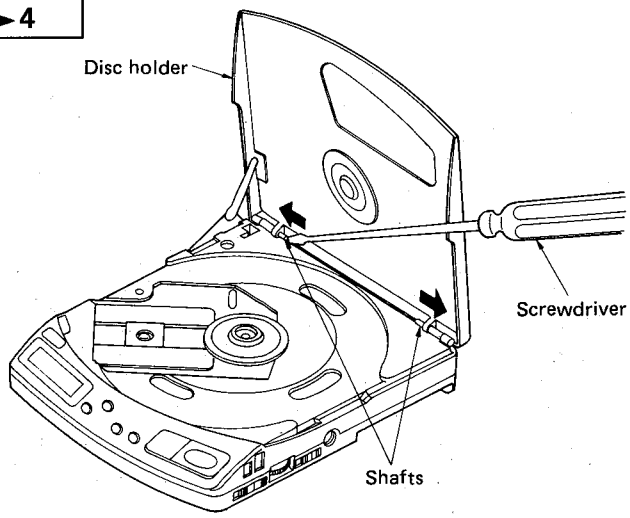


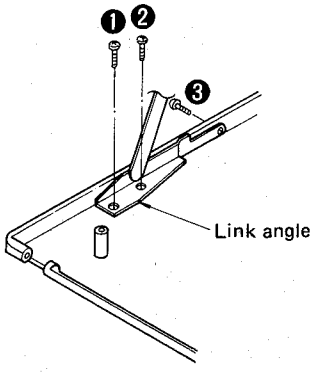


1. Remove the 1 screw (❶).
2. Pull out the main P.C.B. in the direction of the arrow.

Ref. No. 4 — Removal of the disc holder

Procedure 1→4

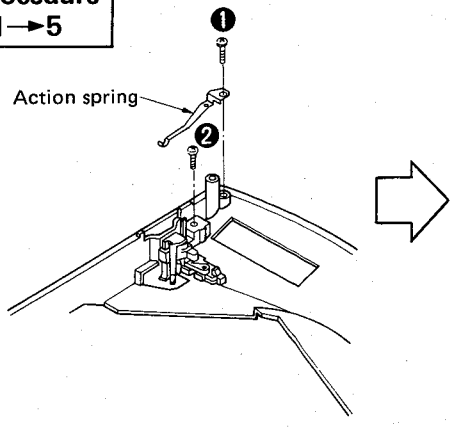


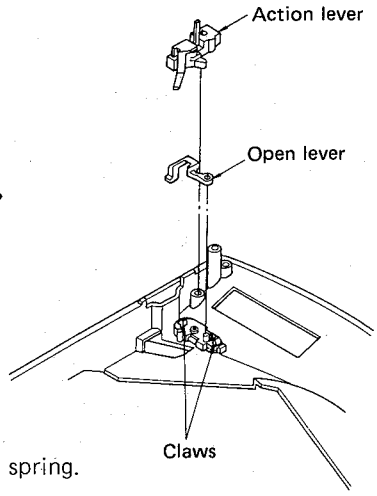


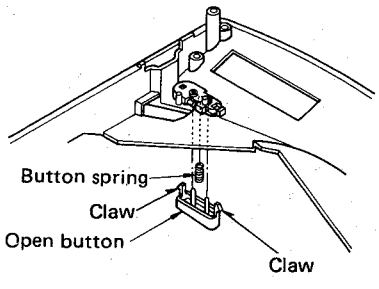
1. Use a screwdriver or similar tool to push the shafts in the direction of the arrow and remove it.
2. Remove the 3 screws (❶ ~ ❸).
3. Remove the link angle.

Ref. No. 5 — Removal of the open button, open lever and action lever

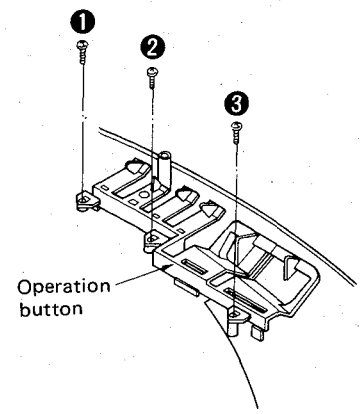
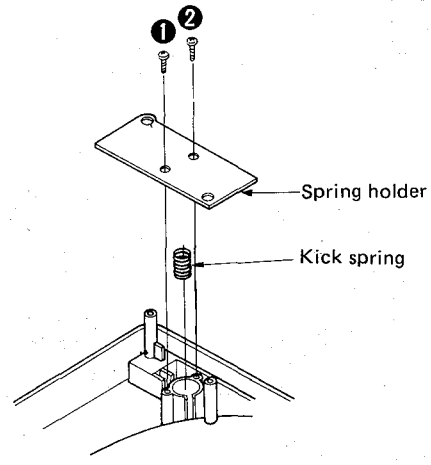
Procedure 1→5



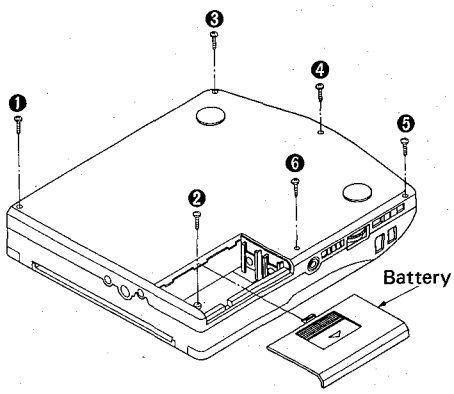




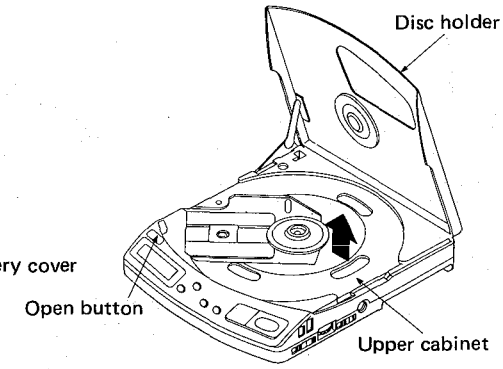
1. Remove the 1 screw (❶) and action spring.
2. Remove the 1 screw (❷).
3. Remove the action lever and open lever.
4. Remove the 2 claws.
5. Remove the open button and button spring.

Ref. No. 6	Removal of the operation button	Ref. No. 7	Removal of the kick spring
Procedure 1→6		Procedure 1→7	
1. Remove the 3 screws (❶ ~ ❸).		1. Remove the 2 screws (❶ , ❷). 2. Remove the spring holder.	

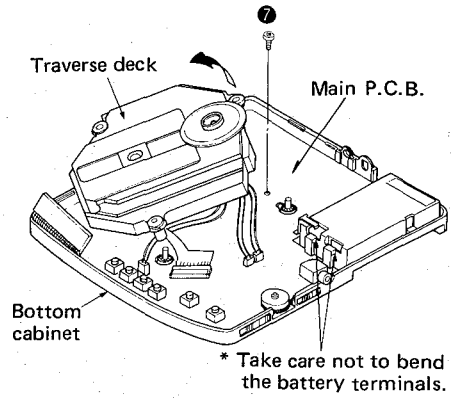
■ HOW TO CHECK THE MAIN P.C.B.



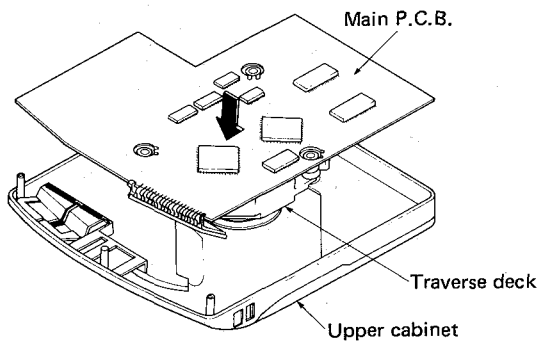
1. Remove the battery cover.
2. Remove the 6 screws (❶~ ❻).



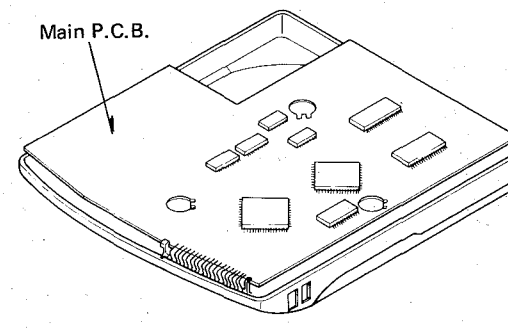
3. Push the open button and open the disc holder.
4. Remove the upper cabinet in the direction of the arrow.



5. Pull out the traverse deck and remove the 1 screw (❼).
6. Replace the traverse deck on the main P.C.B.
7. Remove the traverse deck and the main P.C.B. from the bottom cabinet.



8. Replace the traverse deck and the main P.C.B. on the upper cabinet.



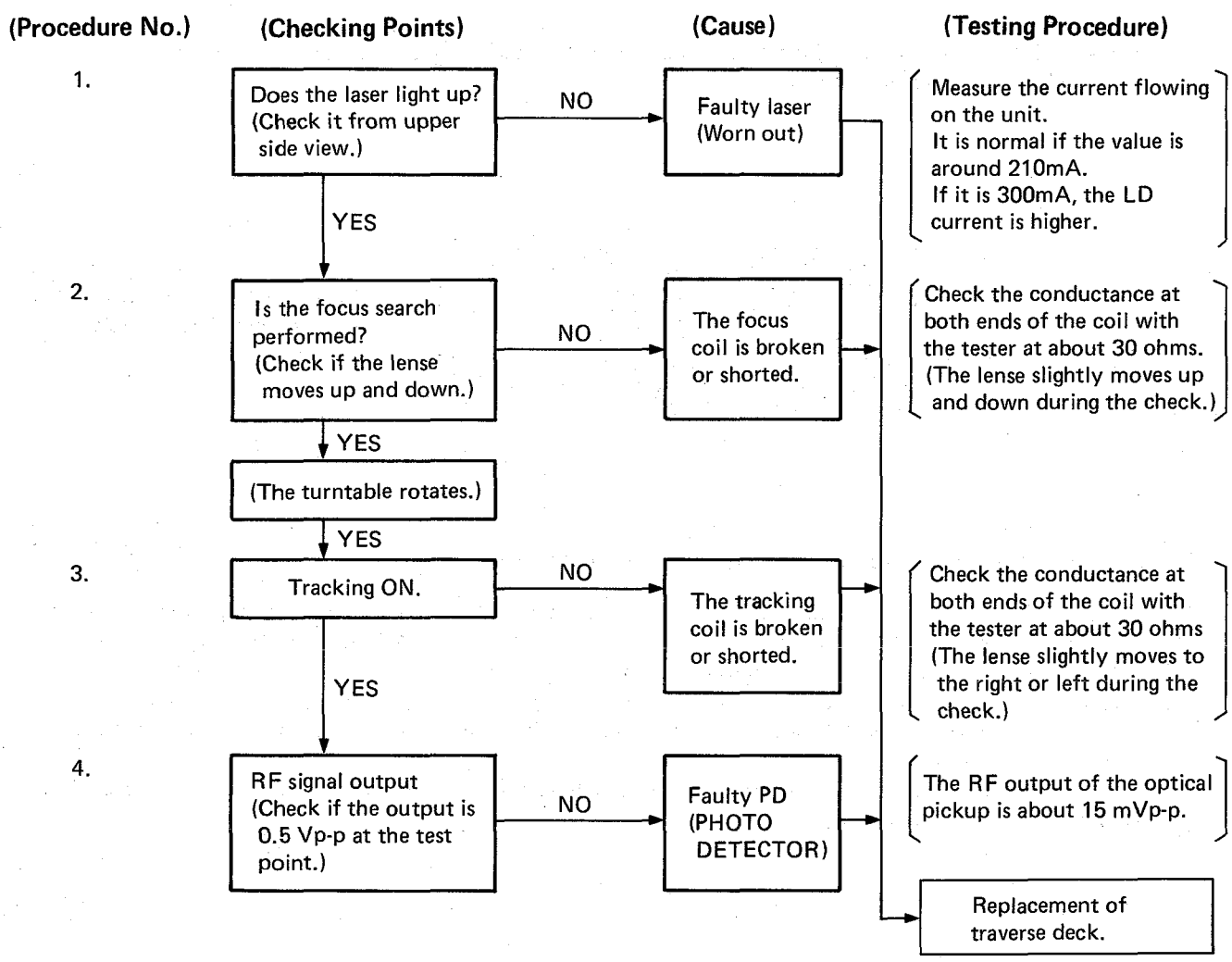
9. Measure the voltage value and waveforms by DC electronic v voltmeter and oscilloscope as shown above.
10. Use the AC adaptor to the mesurement.

■ BEFORE REPLACING TRAVERSE DECK

Check the opeartion of the traverse deck (optical pickup) before replacing it by following the procedures below.

- **Checking the operation of the traverse deck (Optical pickup)**

  Check the operation of the traverse deck (optical pickup) based on the checking points below during the reading of the "TOC" (Table of Contents).


(Procedure No.)
(Checking Points)
(Cause)
(Testing Procedure)
1.
Does the laser light up? (Check it from upper side view.)
NO
Faulty laser (Worn out)
Measure the current flowing on the unit. It is normal if the value is around 210mA. If it is 300mA, the LD current is higher.
YES
2.
Is the focus search performed? (Check if the lense moves up and down.)
NO
The focus coil is broken or shorted.
Check the conductance at both ends of the coil with the tester at about 30 ohms. (The lense slightly moves up and down during the check.)
YES
(The turntable rotates.)
YES
3.
Tracking ON.
NO
The tracking coil is broken or shorted.
Check the conductance at both ends of the coil with the tester at about 30 ohms (The lense slightly moves to the right or left during the check.)
YES
4.
RF signal output (Check if the output is 0.5 Vp-p at the test point.)
NO
Faulty PD (PHOTO DETECTOR)
The RF output of the optical pickup is about 15 mVp-p.
Replacement of traverse deck.

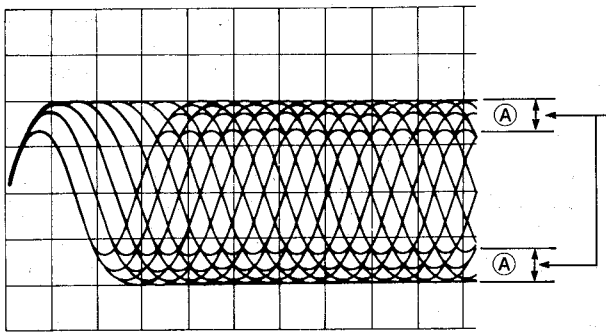
Only the causes of possible problems with regard to the traverse deck (optical pickup) are listed here.
If the traverse deck has operated properly after the testing procedures, then check the circuit.

If the traverse deck has operated properly after the operational checks 1. ~ 4., adjust it again while checking the waveform described in (2) electrical adjustment.

• Electrical adjustment (Make sure to adjust the items in the order shown below.)

(1). Focus balance adjustment (PD balance)
(2). Focus gain adjustment.
(3). Tracking gain adjustment.
(4). Focus offset adjustment.
(5). Tracking offset adjustment.
(6). Tracking balance adjustment.
※(7). Mechanical adjustment.

※ With regard to the mechanical adjustment, only perform it if sections Ⓐ of the waveform in the figure below are very large or if the waves are not clearly visible.

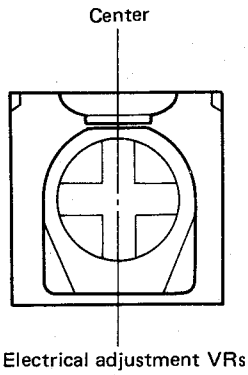


Perform the mechanical adjustment if sections Ⓐ are very large or if the waves are not clearly visible.

• Checking the operation when the traverse deck (optical pickup) is replaced

1. If the electrical adjustment VRs have been turned before replacing the traverse deck (optical pickup), make sure to return each VR to its mechanical center position and then replace the traverse deck (optical pickup).
2. If the mechanical adjustment VRs have not been turned, replace the traverse deck without turning them.
3. After replacing the traverse deck (optical pickup), check its operation (skip and manual search) and make sure that the audio of Track 13 (Black Dot 0.7 mm) and Track 6 (Wedge 0.7 mm) on the test disc (SZZP1054C) are evenly played back and that no noises are heard.
4. If the traverse deck operates properly during the checks, the electrical adjustment is not needed when the traverse deck (optical pickup) is replaced.

• Temporary setting of each VR



Temporary VR setting if any of the electrical adjustment VRs are replaced or require re-adjustment, temporarily set them to the following positions:

■ MEASUREMENTS AND ADJUSTMENTS

Warning : This product uses a laser diode. Refer to caution statements on page 2.
Caution : During adjustment, never connect CH-2 probe's GND to any place for it may short Vref line. (Connect CH-1 probe's GND to specified TP. described in each section.)

Measuring Instruments and Special Tools

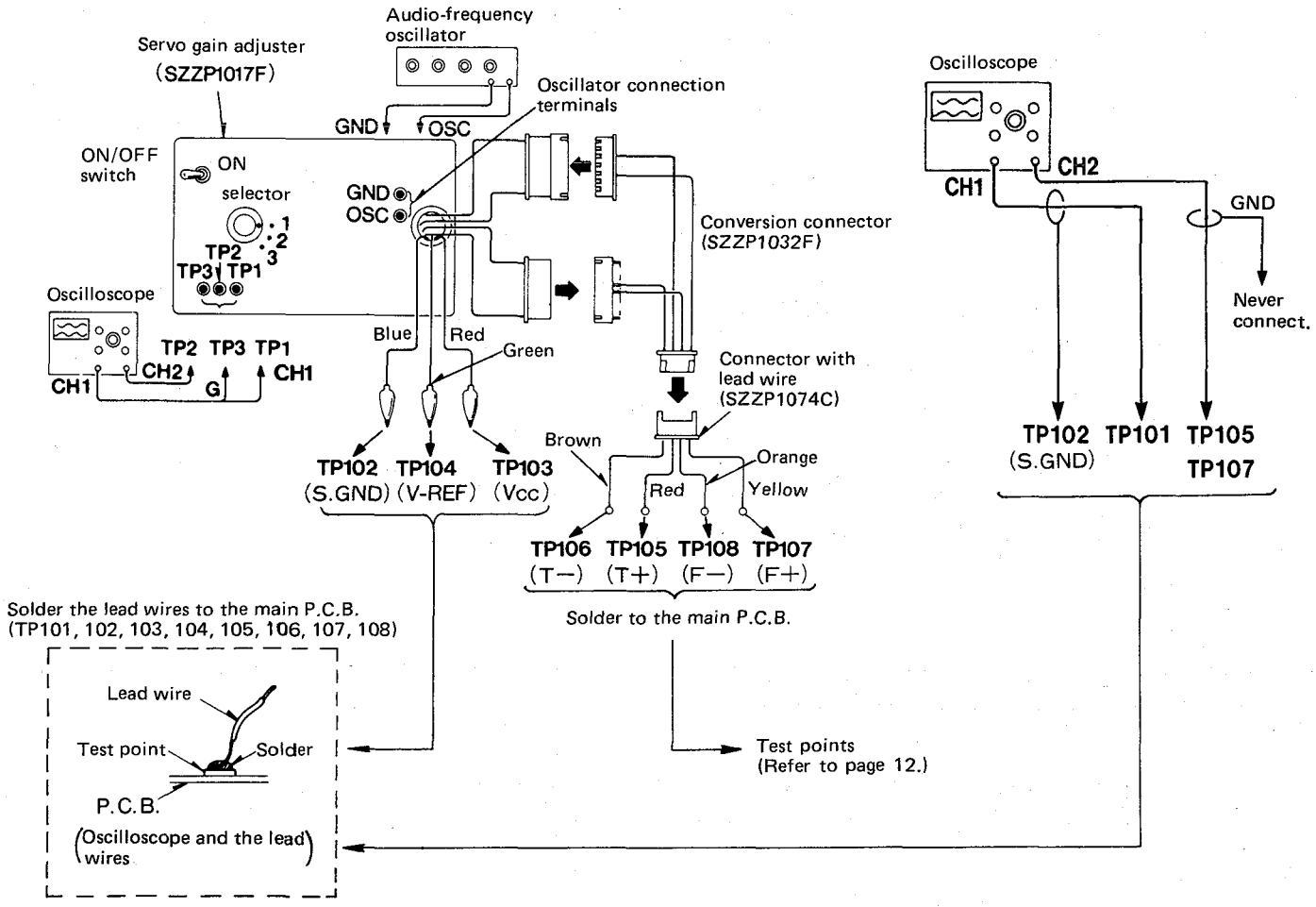
* Servo gain adjuster (SZZP1017F or SZZP1094C)
* Test discs
1. Playability test disc (SZZP1054C)
2. Uneven test disc (SZZP1056C)
3. Black band test disc (SZZP1057C)
* Normal disc
* Dual-beam oscilloscope with bandwidth of 30 MHz or better (with EXT. trigger and 1 : 1 probe).
* Audio-frequency (AF) oscillator
* Conversion connector (SZZP1032F)
* Lead wire (for test points)
* Allen wrench (M2.0) (SZZP1101C)
* Connector with lead wire (SZZP1074C)
* DC voltmeter
* Disc clamper (SDOD39A)

• Preparation for servo gain adjuster

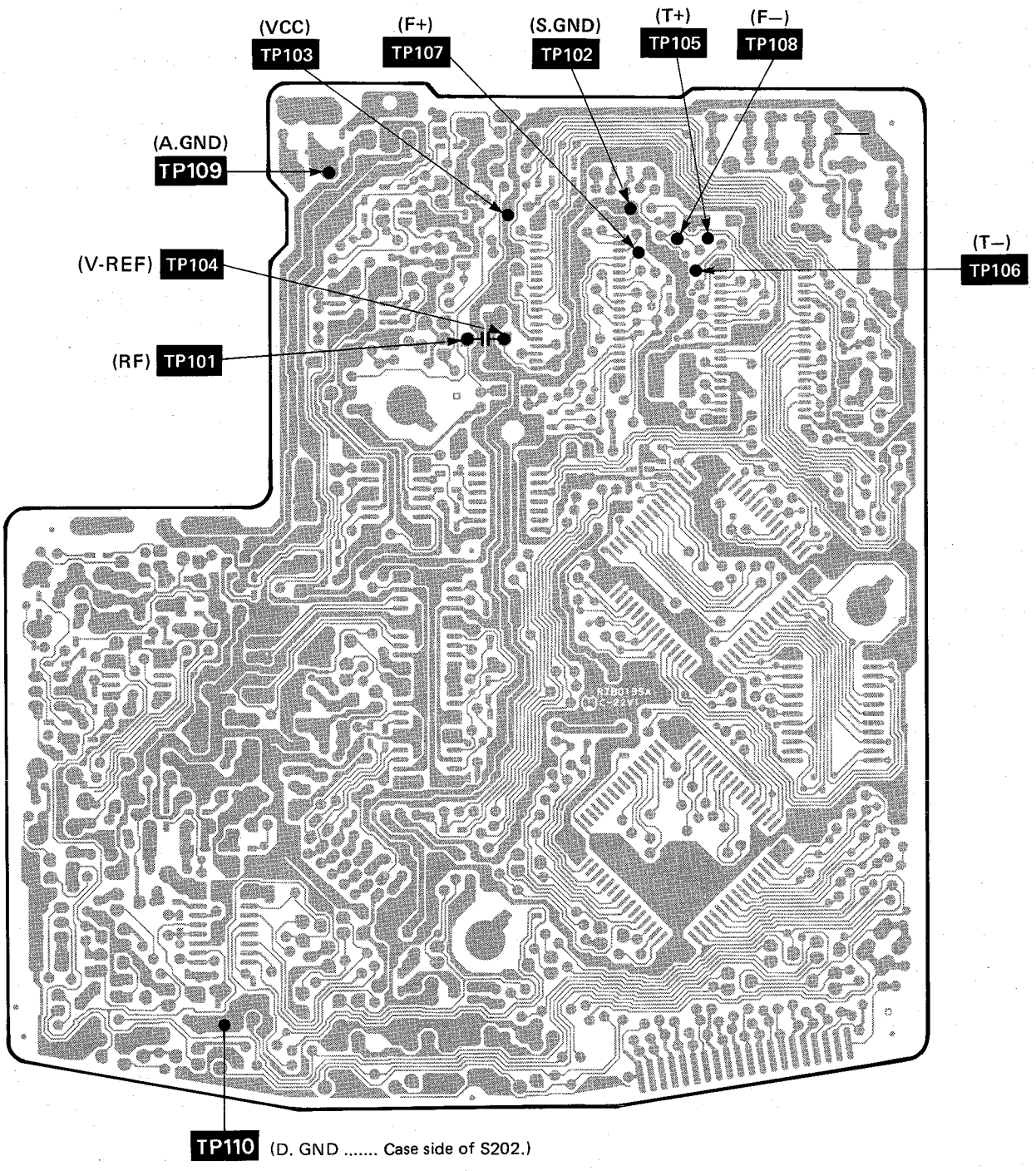
(For tracking gain, focus gain and tracking balance adjustments.)

• Connection of oscilloscope

(For best eye, focus offset, tracking offset and mechanical adjustments.)



- **Test points**



S. GND

Note: Servo Circuit (peripheral IC101, IC102, IC103, IC104)/ A smooth waveform can be seen when the GND lead of the oscilloscope is connected to **TP102** (S. GND).

D. GND

Note: Digital Circuit (peripheral IC201, IC202, IC301) and Power Circuit (peripheral IC11)/ A smooth waveform can be seen when the GND lead of the oscilloscope is connected to **TP110** (D. GND).

A. GND

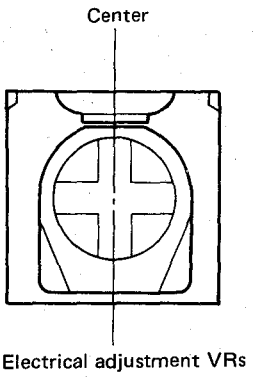
Note: Audio Circuit (peripheral IC302, IC303, IC304)/A smooth waveform can be seen when the GND lead of the oscilloscope is connected to **TP109** (A. GND) located on rear side of the Line Out Jack CN301.

• Precaution for adjustments

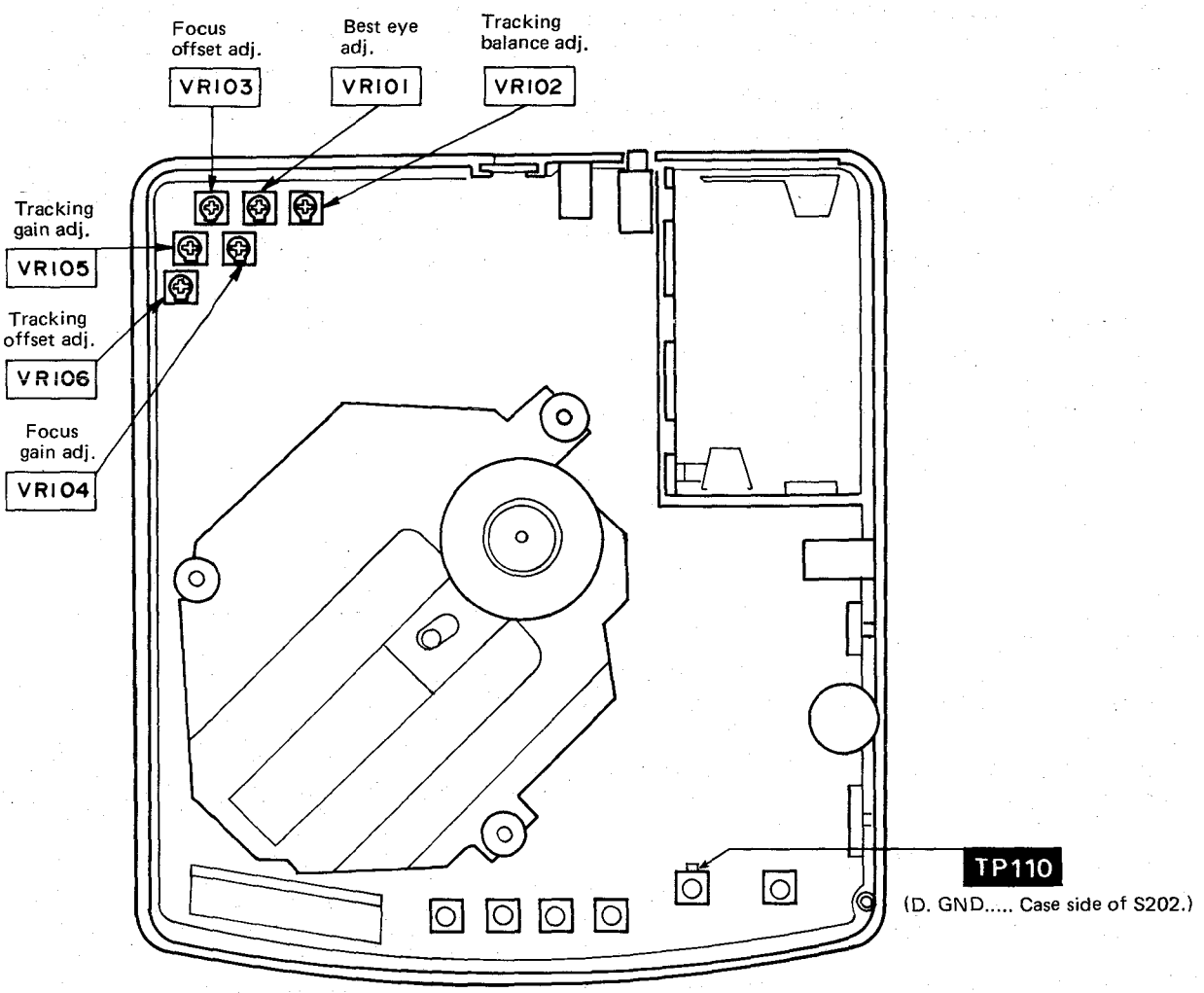
1. Remove the upper cabinet. (Refer to page 6.)
2. Solder the lead wires and connector with lead wire (SZZP1074C) to the test points on the main P.C.B.
3. Confirm the mechanical center.
   In the focus gain adjustment, if **VR104** is turned too far, the rotation of the turntable will stop. Turn a little at a time to the right or left from the mechanical center, and then switch on the power. After finding the position at which rotation starts, repeat the adjustment.
   - If any of the adjustments is substantially out of adjustment, reset the electrical adjustment VRs back to the mechanical center and readjust.

• Temporary setting of each VR

Temporary VR setting if any of the electrical adjustment VRs are replaced or require re-adjustment, temporarily set them to the following positions:



• Adjustment points

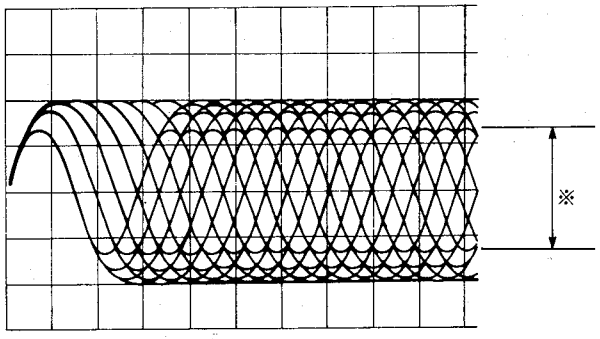


D. GND

Note: Digital Circuit (peripheral IC201, IC202, IC301) and Power Circuit (peripheral IC11)/A smooth waveform can be seen when the GND lead of the oscilloscope is connected to **TP110** (D. GND).

(1) BEST EYE (PD BALANCE) ADJUSTMENT

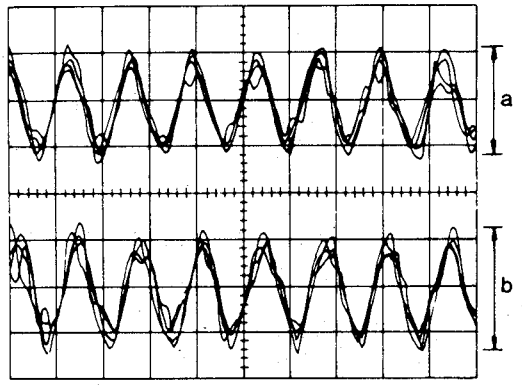
1. Connect the oscilloscope's CH. 1 probe across **TP101** (RF) (+) and **TP102** (S. GND) (–) on the main P.C.B.
   Oscilloscope setting: VOLT. . . . . .100 mV
   SWEEP . . . . . .0.5 μs.
   Input coupling . . AC
2. Switch the player power **ON**, and play the 1 kHz (track 1) on the test disc (SZZP1054C).
3. Adjust **VR101** until the vertical fluctuation of RF signal is minimized and the eye pattern is most stretched.



※ Most stretched eye pattern.

(2) FOCUS GAIN ADJUSTMENT

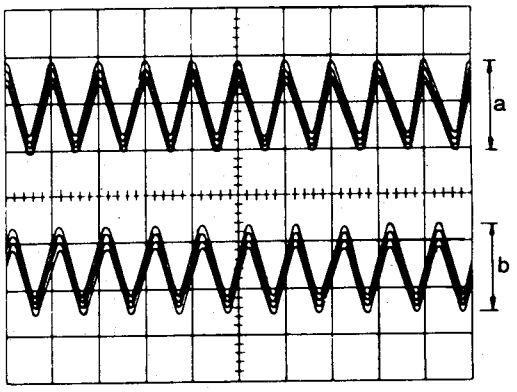
1. Connect the servo gain adjuster to the player.
2. Set the servo gain adjuster's gain switch to position "**2**" and the ON/OFF switch to **ON**.
3. Set up the AF oscillator output for **825 Hz, 200 mVp-p**, and connect it across the OSC and GND terminals on the servo gain adjuster.
4. Connect oscilloscope's CH. 1 and CH. 2 probes to the servo gain adjuster's TP1 and TP2 terminals, respectively (TP3 is GND).
   Oscilloscope setting: VOLT. . . . . .100 mV (both channels)
   SWEEP . . . . . .0.5 ms.
   Input coupling . . AC
5. Play the test disc (SZZP1054C).
6. Set the servo gain adjuster's gain switch to position "**3**", and you will see a 825 Hz signal on the oscilloscope. Adjust **VR104** until the signal amplitudes on both channels become identical to each other.
7. Set the gain switch back to position "**2**".



※ Adjust **VR104** until a equals b.

(3) TRACKING GAIN ADJUSTMENT

1. Set up the AF oscillator output for **1.1 kHz, 200 mVp-p**, and connect it across the OSC and GND terminals on the servo gain adjuster.
2. Connect oscilloscope's CH. 1 and CH. 2 probes to the servo gain adjuster's TP1 and TP2 terminals, respectively (TP3 is GND).
   Oscilloscope setting: VOLT. . . . . .100 mV (both channels)
   SWEEP . . . . . .0.5 ms.
   Input coupling . . AC
3. Switch the player power **ON**, and play the test disc (SZZP1054C).
4. Set the servo gain adjuster's gain switch to position "**1**", and you will see a 1.1 kHz signal on the oscilloscope. Adjust **VR105** until the signal amplitudes on both channels become identical to each other.
5. Set the gain switch back to position "**2**".

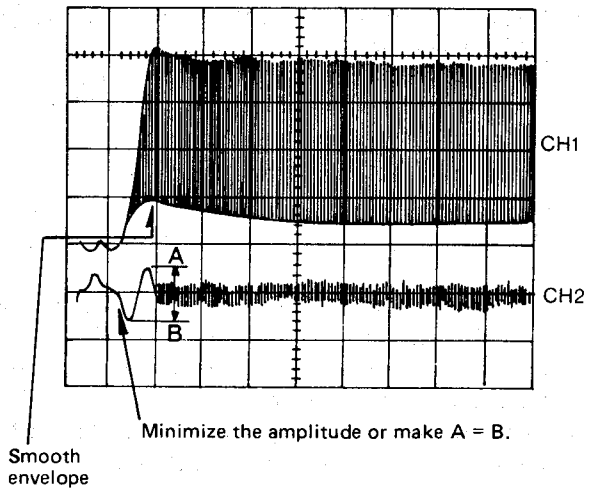


※ Adjust **VR105** until a equals b.

(4) FOCUS OFFSET ADJUSTMENT

Note: Disconnect the servo gain adjuster's power cord.

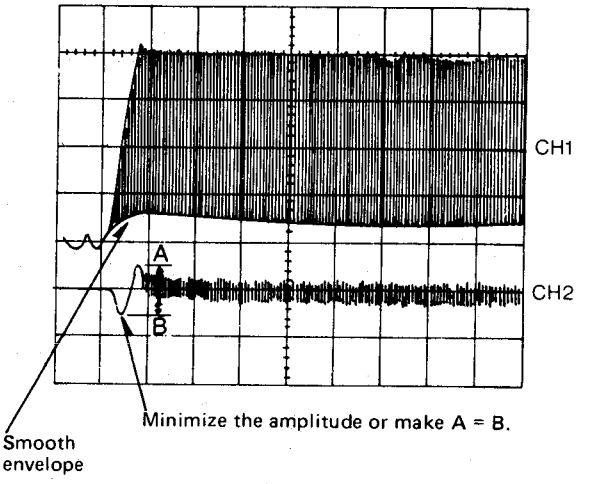
1. Connect the oscilloscope's CH. 1 probe across **TP101** (RF) (+) and **TP102** (S. GND) (–) on the main P.C.B., and its CH. 2 probe (+) to **TP107** (F+) terminal.
   Oscilloscope setting: VOLT. . . . . .100 mV (CH. 1)
   500 mV (CH. 2)
   SWEEP . . . . . .0.5 ms.
   Input coupling . . AC (both CH. 1 and CH. 2)
   Trigger mode . . . NORM (trigger CH. 1)
2. Switch the player power **ON**, and play track **9** on the test disc (SZZP1057C).
3. Trigger the oscilloscope's CH. 1 so that the following waveforms are observed. Adjust **VR103** until the dip in the RF signal envelope on CH. 1 is smooth and the signal amplitude on CH. 2 is minimized, i.e. when amplitude A equals amplitude B.



(5) TRACKING OFFSET ADJUSTMENT

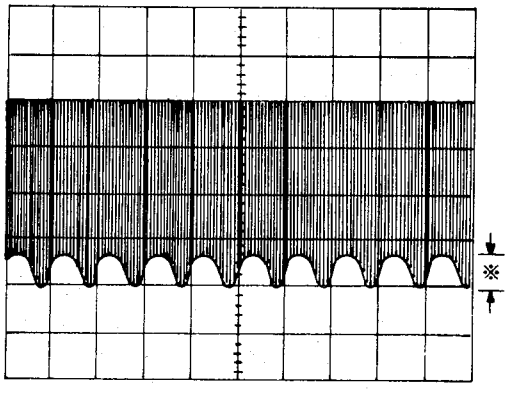
Note: Disconnect the servo gain adjuster's power cord.

1. Connect the oscilloscope's CH. 1 probe across **TP101** (RF) (+) and **TP102** (S. GND) (–) on the main P.C.B., and its CH. 2 probe (+) to **TP105** (T+) terminal.
   Oscilloscope setting: VOLT. . . . . .100 mV (CH. 1)
   500 mV (CH. 2)
   SWEEP . . . . . .0.5 ms.
   Input coupling . . AC (both CH. 1 and 2)
   Trigger mode . . . NORM (trigger CH. 1)
2. Switch the player power **ON**, and play track **9** on the test disc (SZZP1057C).
3. Trigger the oscilloscope's CH. 1 so that the following waveforms are observed. Adjust **VR106** until the dip in the RF signal envelope on CH. 1 is smooth and the signal amplitude on CH. 2 is minimized, i.e. when amplitude A equals amplitude B.



(6) TRACKING BALANCE ADJUSTMENT

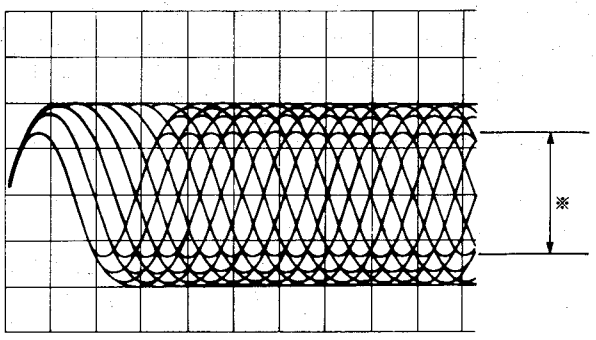
1. Connect the servo gain adjuster's power cord and make sure that servo gain adjuster's gain switch is set to position "**2**".
2. Set up the AF oscillator output for **1.1 kHz, 600mVp-p**, and connect it across the OSC and GND terminals on the servo gain adjuster.
3. Connect oscilloscope's CH. 1 probe across **TP101** (RF) (+) and **TP102** (S. GND) (–) on the main P.C.B. and CH. 2 probe (+) to the OSC terminal on the servo gain adjuster.
   Oscilloscope setting: VOLT. . . . . .100 mV (CH. 1)
   500 mV (CH. 2)
   SWEEP . . . . . .0.5 ms.
   Input coupling . . AC (both CH. 1 CH. 2)
   Trigger mode . . . NORM (trigger CH. 2)
4. Switch the player power **ON**, and play the test disc (SZZP1054C).
5. Set the servo gain adjuster's gain switch to position "**1**", and adjust the **VR102** so that the section of the waveform marked with ※ is balanced on CH. 1.
6. Disconnect the servo gain adjuster's leads from the player.



※ This section of the waveform must be balanced.

(7) MECHANICAL ADJUSTMENT

1. Connect the oscilloscope's CH. 1 probe across **TP101** (RF) (+) and TP102 (S. GND) (–) on the main P.C.B.
   Oscilloscope setting: VOLT . . . . . .100 mV
   SWEEP . . . . . .0.5 μs.
   Input coupling . . AC
2. Switch the player power **ON**, and play track **9** on the test disc (SZZP1056C).
3. Leave the player in play mode, and place it as shown below.
4. Alternately adjust the two mechanical adjusting screws with the 2.0mm allen wrench (SZZP1101C) until the vertical fluctuation of RF signal is minimized and the eye pattern is most stretched.
5. After completing the adjustment, lock the **mechanical adjustments** with lock paint (RZZOL01).



※ Most stretched eye pattern.

Note : When adjusting the traverse deck, hold it as shown in the figures. Adjust it in either of the ways shown in Figure (A) or (B).

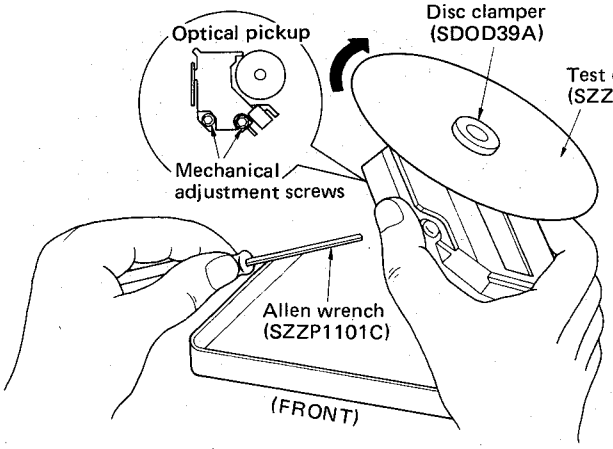
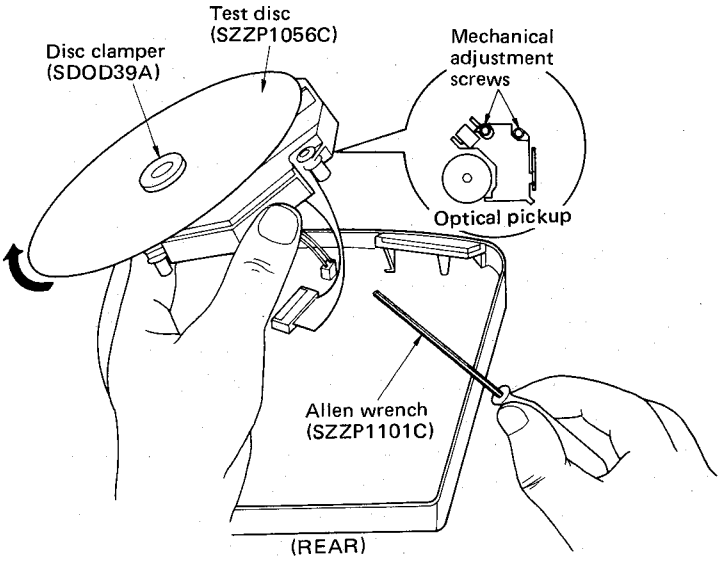


Figure (A)

Figure (B)



(8) CHECK OF PLAY OPERATION AFTER ADJUSTMENT

* **Checking Skip Search**

1. Play an ordinary musical program disc.
2. Press the skip button to check for normal skip search operation (in both the forward and reverse directions).

* **Checking Manual Search**

1. Play an ordinary musical program disc.
2. Press the manual search button to check for smooth manual search operations at either low or high speed (in both the forward and reverse directions).

* **Checking Using Defect Disc**

1. Play the 0.7 mm black dot and the 0.7 mm wedge on the defect test disc (SZZP1054C) and verify that no sound skip or noise occurs.
2. Play the middle tracks of the uneven test disc and verify that no sound skip or noise occurs.

■ TERMINAL FUNCTION OF IC'S

• IC11 : (AN8083SE2) : DC-DC converter control

Pin No.	Mark	I/O Division	Function
1	IN	I	Error amp input
2	FB	O	Error amp output
3	SPRO	I	Short protect input
4	DED	I	Dead time input
5	OUT	O	Switching output
6	GND	I	Ground terminal
7	CT	I	Triangular wave oscillator capacitor input
8	PVCC	I	Power supply terminal

Pin No.	Mark	I/O Division	Function
9	CLK	I	Clock input
10	$\overline{\text{START}}$	I	Start input
11	POWER	I	Power ON/OFF
12	VREF	O	Reference voltage output
13	EMP	O	Empty detection output
14	VSEN	I	Empty detection input
15	RST	O	Reset output
16	VCC	I	Power supply terminal

• IC101 (AN8373SE2) : Servo amp.

Pin No.	Mark	I/O Division	Function
1	AMP1	I	RF signal input (X30 amp.) (Not used, connected to GND)
2	PDAD	I	Photo detector current input (A2)
3	PDA	I	Photo detector current input (A1)
4	PDBD	I	Photo detector current input (A4)
5	PDB	I	Photo detector current input (A3)
6	LPD	I	Non-inverting laser power input
7	LD	O	Laser power auto control output
8	FBL1	I	PD balance adjustment
9	FBL2	I	
10	TBL1	I	Tracking balance adjustment
11	TBL2	I	
12	FOOFS	I	Focus offset adjustment
13	IVA	O	Current/voltage conversion output (A)
14	IVB	O	Current/voltage conversion output (B)
15	FE	O	Focus gain adjustment output
16	FPI	I	Focus error signal input
17	TPI	I	Tracking error signal input
18	C. TPL	I	Tracking error filter capacitor input
19	C. TPH		
20	C. FPL	I	Focus error filter capacitor input
21	C. FPH		

Pin No.	Mark	I/O Division	Function
22	TPO	O	Tracking error signal output
23	FPO	O	Focus error signal output
24	FGC	I	Focus gain up signal input
25	TGC	I	Tracking gain up signal input
26	GD	I	Focus/tracking gain down signal input
27	PTO	O	Position detection amp. output (Not used, open)
28	PTI	I	Position detecting amp. output (Not used, open)
29	PBO	O	Position detection buffer output (Not used, open)
30	POT	I	Position detecting buffer input
31	BDO	O	Dropout detection output
32	$\overline{\text{RFDET}}$	O	RF detection signal output
33	SDO	O	Dropout detection pulse output
34	C. SBDO	I	Dropout detecting capacitor input
35	ARF	O	RF signal output
36	C. AGC	I	AGC detecting capacitor input
37	VCC	I	Power supply (+4.5V)
38	LDON	I	Laser power control input
39	RF IN	I	RF signal input
40	AMPO	O	RF signal output (Not used, open)
41	VREF	O	Reference voltage output
42	GND	I	Ground terminal

• IC102 (AN8374SE2) : Servo processor

Pin No.	Mark	I/O Division	Function
1	LSA	I	Phase difference input (A)
2	LSB	I	Phase difference input (B)
3	TEOFS	I	Tracking offset adjustment
4	TE	O	Tracking gain adjustment
5	TEG	I	
6	TE OUT	O	Tracking error signal output
7	TE BPF	I	Tracking error gain detecting filter
8	FEG	I	Focus gain adjustment
9	FE OUT	O	Focus error signal output
10	CLW	O	Triangular wave oscillator capacitor input
11	VREF	I	Reference voltage input
12	ARF	I	RF signal input
13	CDSL	I	Data slice filter capacitor input
14	FPC	I	Frequency difference signal input
15	GND	I	Ground terminal
16	C. PLL	I	PLL loop filter constant
17	VSS	I	Ground terminal
18	CLK	I	Frequency pull-in clock signal (88.2 kHz) input
19	SRF	O	Sliced and digitized RF signal output
20	PCK	O	Clock output extracted from SRF
21	EFM	O	EFM signal output synchronous with PCK

Pin No.	Mark	I/O Division	Function
22	VDD	I	Power supply (+4.5V input)
23	SPCNT	O	Track crossing speed control output output (Not used, open)
24	SENSE	O	Selector output (track crossing state)
25	TRV	O	Traverse servo control output
26	$\overline{\text{FLOCK}}$	O	Focus lock signal output
27	KICK	O	Track kick signal output
28	LDON	O	Laser power control output
29	VDET	O	Focus/tracking gain up output
30	CNT1	I	Control input ($\overline{\text{FOON}}$: Focus servo ON signal)
31	CNT2	I	Control input ($\overline{\text{TRON}}$: Tracking servo ON signal)
32	CNT3	I	Control input (KICKF: Kick direction (forward) command)
33	CNT4	I	Control input (KICKR: Kick direction (reverse) command)
34	TRVF	I	Traverse forward command signal
35	TRVR	I	Traverse backward command signal
36	$\overline{\text{RFDET}}$	I	RF detection signal input
37	BDO	I	Dropout detection input
38	VCC	I	Power supply (+4.5V input)
39	TVPO	O	Traverse position detecting resistor/capacitor inputs
40	TVPI	I	
41	BROUT	O	Tracking drive control output
42	BRIN	I	Tracking error signal input

• IC103, 104 : (AN8387SE2): Motor & actuator coil drive

Pin No.	Mark	I/O Division	Function
1	VCC	I	Power supply (+4.8V input)
2	INI	I	Spindle motor drive signal input and tracking coil drive signal input
3	PCI	I	Spindle motor ON signal input
4	VREF	I	Reference voltage input
5	P. GND	I	Ground terminal
6			
7	S. GND	I	Ground terminal
8	PC2	I	Traverse motor brake control input
9	IN2	I	Traverse motor drive signal input and focus coil drive signal input
10	VCC	I	Power supply terminal

Pin No.	Mark	I/O Division	Function
11	VLIM2	I	Voltage limit terminal
12	P. VCC	I	Power supply terminal
13	D2+	O	Traverse motor drive signal output and focus coil drive signal output
14	D2–		
15	P. GND	I	Ground terminal
16			
17	D1+	O	Spindle motor drive signal output and tracking coil drive signal output
18	D1–		
19	P. VCC	I	Power supply (+4.8V input)
20	VLIMI	I	Voltage limit terminal

• IC201 (MN15845PEQ) : System control

Pin No.	Mark	I/O Division	Function
1	VDD	I	Power supply (connected to +4.8V)
2	OSC1	I	Clock input (4.2336 MHz)
3	OSC2	O	Not used, open
4	TCNT	I	Track count input (trackcross input in rough search)
5	X0	O	Not used, open
6	$\overline{\text{RESET}}$	I	Reset signal input (reset at "L")
7	$\overline{\text{SYNC}}$	O	Not used, open
8	BLKCK	I	Q data read-in timing strobe signal input (sub-code block clock : 75 Hz)
9	$\overline{\text{SIRQ}}$	I	Data clock
10	$\overline{\text{SUBQ}}$	I	Q data read-in input (sub-code Q code)
11	$\overline{\text{SBO}}$	O	Not used, open
12	$\overline{\text{CLDCK}}$	I	Q data read-in data strobe signal input (sub-code block clock : 7.35 kHz)
13 ~ 16	P40 ~ P43	I	Key return signal input
17	MCLK	I/O	Key input strobe and data clock output
18	MDATA	I/O	Key input strobe and data output
19	STROBE	I/O	Key input strobe signal
20	MLD	O	Data strobe signal output (signal processing LSI command load output)
21	$\overline{\text{SENSE}}$	I	Optical servo status (track cross) input
22	$\overline{\text{FLOCK}}$	I	Optical servo status (focus) input
23	BATT	I	Battery voltage detection signal input
24	STAT	I	Processing status input from signal processing LSI
25	CNT4	O	Optical servo IC control signal (KICKR : Kick direction [reverse] command)
26	CNT3	O	Optical servo IC control signal (KICKF : Kick direction [forward] command)
27	CNT2	O	Optical servo IC control signal ($\overline{\text{TRON}}$: Track servo)
28	CNT1	O	Optical servo IC control signal ($\overline{\text{FOON}}$: Focus servo)
29	POWER	O	Power save control (power save at "H")
30	TRREV	O	Traverse motor reverse command signal
31	TRFWD	O	Traverse motor forward command signal
32	MUTE	O	Muting control (muting ON at "H")
33	VLCD 1	I	LCD drive power supply (3.1V)
34	VLCD 2	I	LCD drive power supply (1.5V)
35	VLCD 3	I	LCD drive power supply (0V)
36 ~ 38	COM0 ~ COM2	O	LCD common line output
39	COM3	O	Not used, open
40 ~ 44	SEG0 ~ SEG4	O	LCD segment line output
45 ~ 47	SEG5 ~ SEG7	O	Not used, open
48 ~ 63	SEG8 ~ SEG23	O	LCD segment line output
64	VSS	I	GND terminal

• IC302: (UPD6372GSE1): D/A Converter

Pin No.	Mark	I/O Division	Function
1	NC	–	Not connected
2	D. GND	I	Ground terminal
3	D. VDD	I	Power supply (connected to +4.8V)
4			
5	A. GND	I	Ground terminal
6	R. OUT	O	R ch signal output
7	A. VDD	I	Power supply (connected to +4.8V)
8			
9	R. REF	O	R ch reference voltage capacitor output
10	L. REF	O	L ch reference voltage capacitor output
11	L. OUT	O	L ch signal output
12	A. GND	I	Ground terminal
13	LRCK	I	L/R clock signal input
14	LRSEL	I	L/R clock selector (Not used, connected to power supply)
15	SI	I	Serial data signal input
16	SLK	I	Serial bit clock input

• IC202 (MN6625) : Digital signal processor

Pin No.	Mark	I/O Division	Function
1	BYTCK	O	Serial data byte clock (Not used, open)
2	FCLK	O	Crystal frame clock (7.35 kHz) (Not used, open)
3	DEMPH	O	De-emphasis ON signal (de-emphasis ON at "H")
4	SRDATA	O	Serial data output (MSB first)
5	SCK	O	Serial bit clock output
6	LRCK	O	LR discrimination signal output
7	WDCK	O	Serial data output word clock
8	LDG	O	L channel deglitch signal (Not used, open)
9	RDG	O	R channel deglitch signal (Not used, open)
10	IPFLAG	O	Interpolation flag (interpolation at "H")
11	FLAG	O	Error flag terminal
12	XCK	O	Clock (16.9344MHz) output (Not used, open)
13	$\overline{\text{TEST}}$	I	Test mode selection (Not used, connected to +4.0V)
14	TX	O	Digital signal output (Not used, open)
15	SLEEP	I	Mode selector (Not used, connected to GND) ("L": normal, "H": SLEEP mode)
16	CSEL	I	Test terminal ("L": normal) (Not used, connected to GND)
17	X1	I	Clock input (16.9344 MHz)
18	X2	O	Clock output (16.9344 MHz)
19	VSS	I	GND terminal
20	BLKCK	O	Sub-code block (Q data) clock (75 Hz)
21	$\overline{\text{CLDCK}}$	O	Sub-code frame (Q data) clock (7.35 kHz)
22	$\overline{\text{SUBQ}}$	O	Sub-code (Q data) output
23	$\overline{\text{RST}}$	I	Reset signal input (reset at "L")
24	MLD	I	Command load signal input
25	MCLK	I	Command clock signal input
26	MDATA	I	Command data input
27	DMUTE	I	Muting control
28	$\overline{\text{TRON}}$	I	Tracking servo ON signal (tracking servo ON at "L")
29	STAT	O	Processing condition (CRC, CUE, CLVS, TT STOP, FCLV)
30	SUBC	O	Sub-code serial output data (Not used, open)
31	SBCK	I	Clock for sub-code serial output (Not used, open)
32	SMCK	O	Clock output (4.2336 MHz)
33	VDD	I	Power supply (connected to +4.0V)
34	MEMP	I	Emphasis signal input (Not used, connected to power supply)
35	FG	I	Spindle motor FG signal input (Not used, connected to power supply)
36	PC	O	Spindle motor ON signal (ON at "L")
37	EC	O	Spindle motor drive signal
38	RESY	O	Resynchronizing signal (Not used, open)
39	DO	I	Drop-out signal (Drop-out at "H")
40	SRF	I	EFM signal input (DSL)
41	EFM	I	EFM signal input (PLL)
42	PCK	I	PLL extract clock input (4.3218 MHz)
43	FPC	O	PLL frequency comparision signal
44 ~ 51	D7 ~ D0	I/O	16K RAM data input/output
52	RAM/OE	O	16K RAM $\overline{\text{OE}}$ signal
53	RAM/WE	O	16K RAM $\overline{\text{WE}}$ signal
54 ~ 64	RAM/A0 ~ RAM/A10	O	16K RAM address signal (RAMA0: LSB, RAMA10: MSB)

• IC301 (SM

Pin No.	Mark
1	XT
2	$\overline{\text{XT}}$
3	$\overline{\text{CKSL}}$
4	CKO
5	LRCI
6	DIN
7	BCKI
8	VSS

■ TERMIN

Function
status input from signal LSI
vo IC control signal Kick direction [reverse]
vo IC control signal Kick direction [forward]
vo IC control signal Track servo)
vo IC control signal Focus servo)
control e at "H")
otor reverse command
otor forward command
trol N at "H")
power supply (3.1V)
power supply (1.5V)
power supply (0V)
mon line output
pen
nent line output
, open
nent line output
nal

Function
ce voltage capacitor
utput
minal
gnal input
lector onnected to power
gnal input
ck input

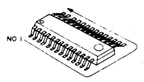
• IC202 (MN6625) : Digital signal processor

Pin No.	Mark	I/O Division	Function
1	BYTCK	O	Serial data byte clock (Not used, open)
2	FCLK	O	Crystal frame clock (7.35 kHz) (Not used, open)
3	DEMPH	O	De-emphasis ON signal (de-emphasis ON at "H")
4	SRDATA	O	Serial data output (MSB first)
5	SCK	O	Serial bit clock output
6	LRCK	O	LR discrimination signal output
7	WDCK	O	Serial data output word clock
8	LDG	O	L channel deglitch signal (Not used, open)
9	RDG	O	R channel deglitch signal (Not used, open)
10	IPFLAG	O	Interpolation flag (interpolation at "H")
11	FLAG	O	Error flag terminal
12	XCK	O	Clock (16.9344MHz) output (Not used, open)
13	$\overline{\text{TEST}}$	I	Test mode selection (Not used, connected to +4.0V)
14	TX	O	Digital signal output (Not used, open)
15	SLEEP	I	Mode selector (Not used, connected to GND) ("L": normal, "H": SLEEP mode)
16	CSEL	I	Test terminal ("L": normal) (Not used, connected to GND)
17	X1	I	Clock input (16.9344 MHz)
18	X2	O	Clock output (16.9344 MHz)
19	VSS	I	GND terminal
20	BLKCK	O	Sub-code block (Q data) clock (75 Hz)
21	$\overline{\text{CLDCK}}$	O	Sub-code frame (Q data) clock (7.35 kHz)
22	$\overline{\text{SUBQ}}$	O	Sub-code (Q data) output
23	$\overline{\text{RST}}$	I	Reset signal input (reset at "L")
24	MLD	I	Command load signal input
25	MCLK	I	Command clock signal input
26	MDATA	I	Command data input
27	DMUTE	I	Muting control
28	$\overline{\text{TRON}}$	I	Tracking servo ON signal (tracking servo ON at "L")
29	STAT	O	Processing condition (CRC, CUE, CLVS, TT STOP, FCLV)
30	SUBC	O	Sub-code serial output data (Not used, open)
31	SBCK	I	Clock for sub-code serial output (Not used, open)
32	SMCK	O	Clock output (4.2336 MHz)
33	VDD	I	Power supply (connected to +4.0V)
34	MEMP	I	Emphasis signal input (Not used, connected to power supply)
35	FG	I	Spindle motor FG signal input (Not used, connected to power supply)
36	PC	O	Spindle motor ON signal (ON at "L")
37	EC	O	Spindle motor drive signal
38	RESY	O	Resynchronizing signal (Not used, open)
39	DO	I	Drop-out signal (Drop-out at "H")
40	SRF	I	EFM signal input (DSL)
41	EFM	I	EFM signal input (PLL)
42	PCK	I	PLL extract clock input (4.3218 MHz)
43	FPC	O	PLL frequency comparision signal
44 ⟆ 51	D7 ⟆ D0	I/O	16K RAM data input/output
52	RAM/OE	O	16K RAM $\overline{\text{OE}}$ signal
53	RAM/WE	O	16K RAM $\overline{\text{WE}}$ signal
54 ⟆ 64	RAM/A0 ⟆ RAM/A10	O	16K RAM address signal (RAMA0: LSB, RAMA10: MSB)

• IC301 (SM5807ESET) : Digital filter

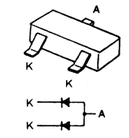
Pin No.	Mark	I/O Division	Function
1	XT	I	Osicllator input
2	$\overline{\text{XT}}$	O	Oscillator output (not used, open)
3	$\overline{\text{CKSL}}$	I	$\overline{\text{CKSL}}$ = H : External input of 16.9344 MHz or 17.2872 MHz to XT $\overline{\text{CKSL}}$ = L : External input of 8.4672 MHz or 8.6436 MHz to XT
4	CKO	O	Clock output (not used, open)
5	LRCI	I	44.1 kHz synchronization clock input
6	DIN	I	Serial data input
7	BCKI	I	Serial data bit clock input
8	VSS	I	Digital ground terminal
9	$\overline{\text{SCSL}}$	I	$\overline{\text{SCSL}}$ = H : System clock = 192 fs $\overline{\text{SCSL}}$ = L : System clock = 196 fs (fs = sampling frequency)
10	DGR	O	R ch deglitch signal (176.4 kHz) (not used, open)
11	DGL	O	L ch deglitch signal (176.4 kHz) (not used, open)
12	D OUT	O	Serial data output
13	WDCO	O	Output control clock (352.8 kHz)
14	$\overline{\text{LRCO}}$	O	Output control clock (176.4 kHz)
15	BCKO	O	Serial bit clock output (8.4672 MHz or 8.6436 MHz)
16	VDD	I	Power supply terminal (connected to +4.8V)

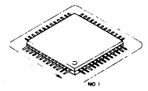
■ TERMINAL GUIDE OF IC'S, TRANSISTORS AND DIODES



NJM2100MAT1	8 pin	SM5807ESET	16 pin
NJM3414MT1		UPD6372GSE1	
AN8373SE2	42 pin	AN8083SE2	
AN8374SE2		LC3517BML15T	24 pin
		AN8387SE2	20 pin

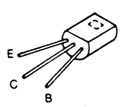
MA151WATW

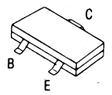




MN15845PEQ	64 pin
MN6625	

2SD1302STTA





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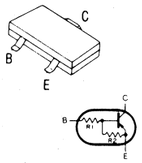
2SB970QRSTW,
2SB709QRSTW,
2SD1757KQSTW



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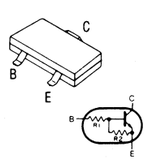
DTA124TKT97,
DTA144TKT97,
2SD601QRSTW



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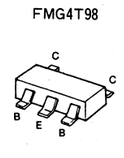
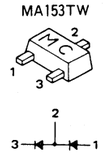
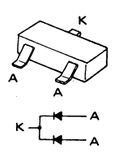
FMG4T98



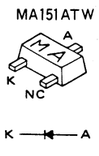
MA153TW



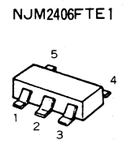


MA15WKTW,
MA721TW,

MA151ATW



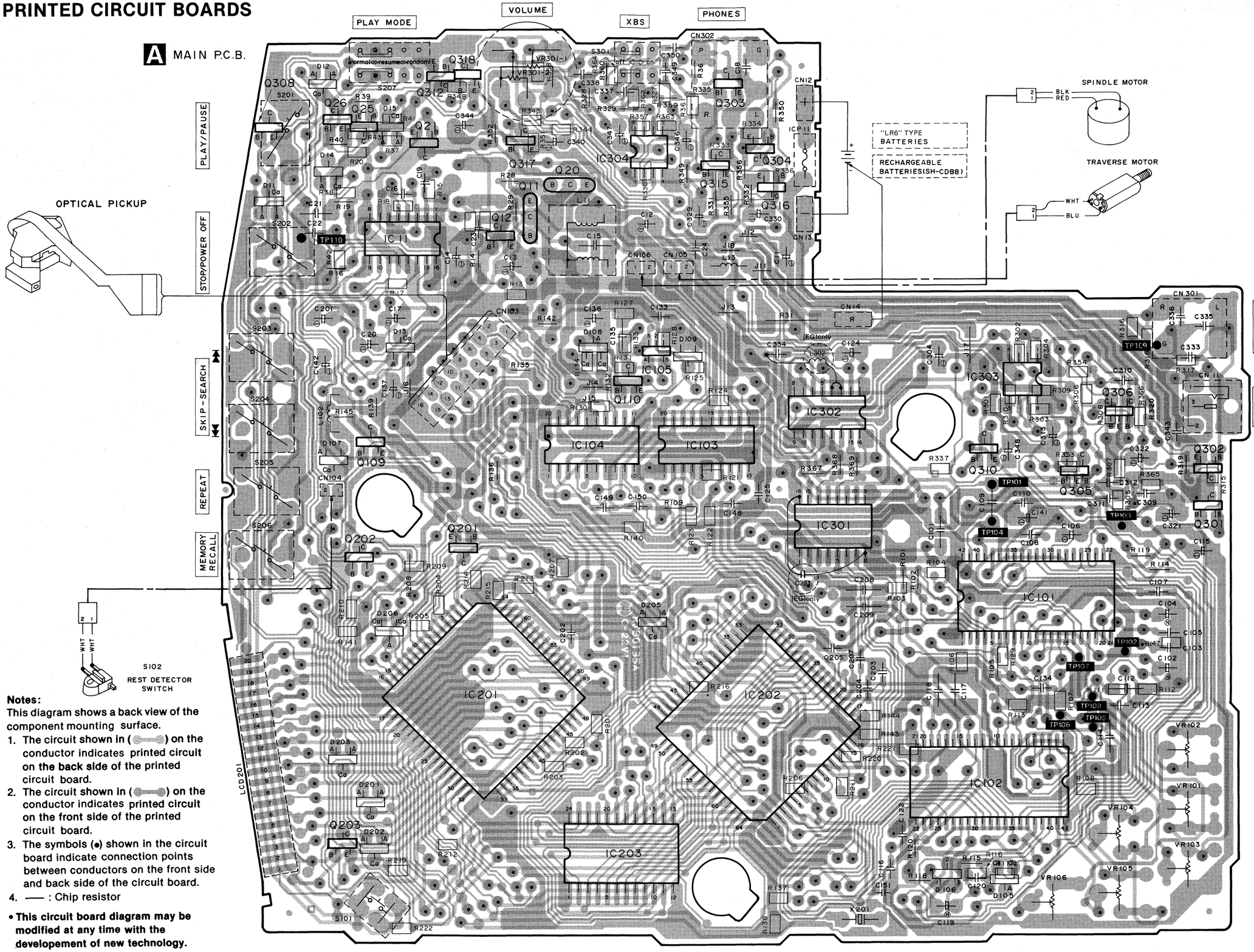
NJM2406FTE1



SL-XP2 SL-XP2

■ PRINTED CIRCUIT BOARDS

A MAIN P.C.B.



Notes:

This diagram shows a back view of the component mounting surface.

1. The circuit shown in ( ) on the conductor indicates printed circuit on the back side of the printed circuit board.
2. The circuit shown in ( ) on the conductor indicates printed circuit on the front side of the printed circuit board.
3. The symbols (●) shown in the circuit board indicate connection points between conductors on the front side and back side of the circuit board.
4. —— : Chip resistor

• This circuit board diagram may be modified at any time with the developement of new technology.

■ SCHEMATIC

(This schematic diagram r
the development of new t

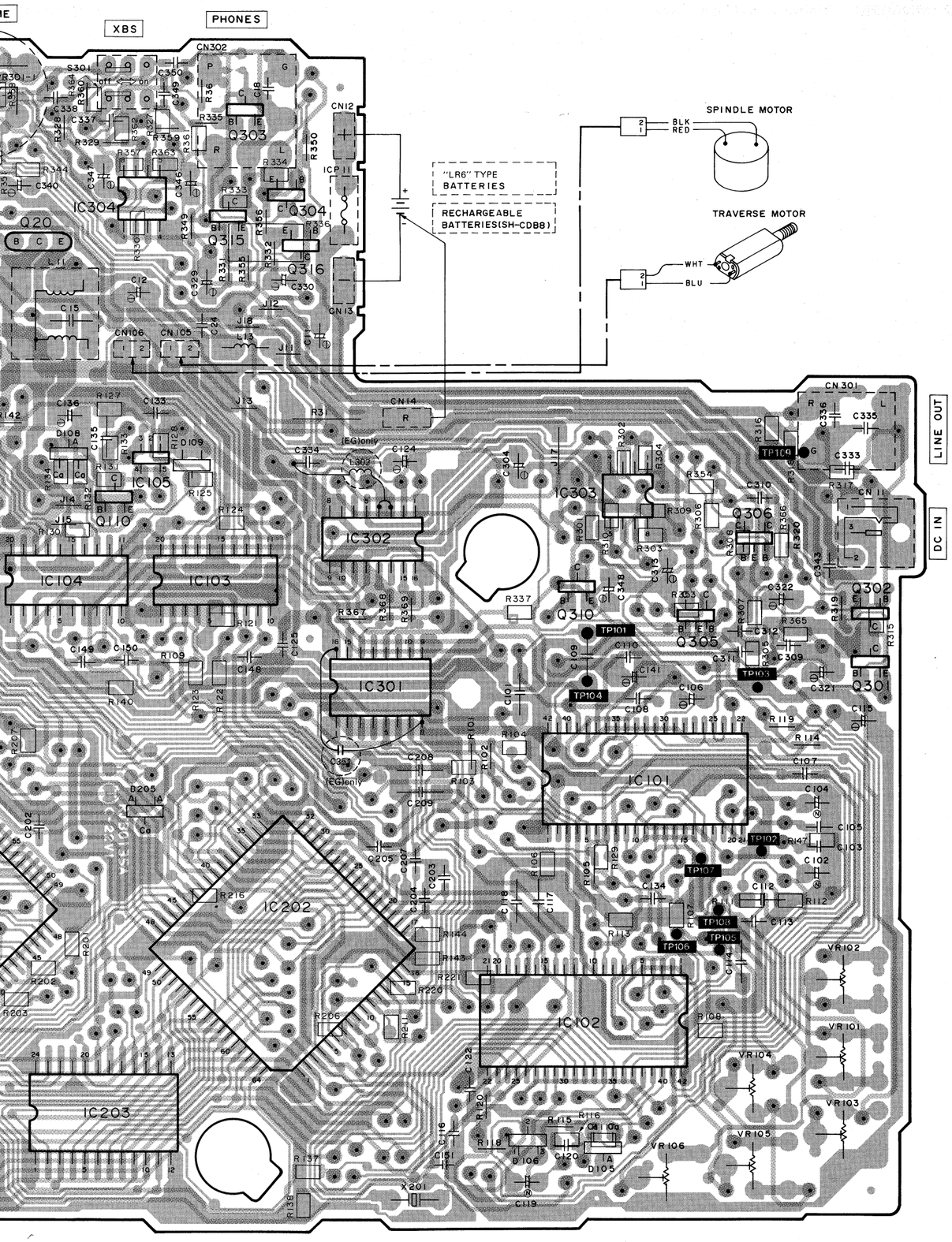
Notes:

- **S101** : Laser ON/OF (It turns "**on**
- **S102** : Rest switch (It turns "**on** most periphe
- **S201** : Play/pause sv
- **S202** : Stop/power
- **S203** : Skip/search (
- **S204** : Skip/search (
- **S205** : Repeat switc
- **S206** : Memory/reca
- **S207** : Play mode se (random ←→
- **S301** : XBS switch i
- The voltage value and wave measured by DC electro oscilloscope on the basis of Accordingly, there may a and waveforms depending tester or measuring unit.
  * The parenthesized is the 0 dB) in play mode, and
  * AC adaptor (SH-CDA6U)

■ INTERNAL CONN

• Common connec

• Segment connecti



■ SCHEMATIC DIAGRAM (Parts list on pages 34 ~ 36.)

(This schematic diagram may be modified at any time with the development of new technology.)

Notes:

- **S101** : Laser ON/OFF switch in "**off**" position. (It turns "**on**" with disc holder closed.)
- **S102** : Rest switch in **"off"** position. (It turns "**on**" when optical pickup comes to inner-most periphery.)
- **S201** : Play/pause switch.
- **S202** : Stop/power off switch.
- **S203** : Skip/search (Forward) switch.
- **S204** : Skip/search (Backward) switch.
- **S205** : Repeat switch.
- **S206** : Memory/recall switch.
- **S207** : Play mode selector switch. (random ⟷ resume ⟷ normal)
- **S301** : XBS switch in "**off**" position.
- The voltage value and waveforms are the reference voltage of this measured by DC electronic voltmeter (high impedance) and oscilloscope on the basis of GND terminal (DC IN Jack). Accordingly, there may arise some error in the voltage values and waveforms depending upon the internal impedance of the tester or measuring unit.
  * The parenthesized is the voltage for test disc (1 kHz, L + R, 0 dB) in play mode, and the other, for no disc in stop mode.
  * AC adaptor (SH-CDA6U) is used for power supply.
- ⟨ ⟩ : Positive voltage lines.
  ▒▒▒ : Aduio signal lines.
- Important safety notice: Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
- ※ marks indicate printed resistor

* Caution !

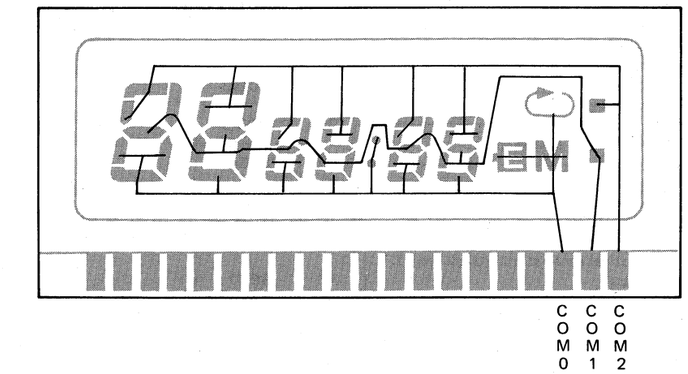
IC and LSI are sensitive to static electricity.

Secondary trouble can be prevented by taking care during repair.

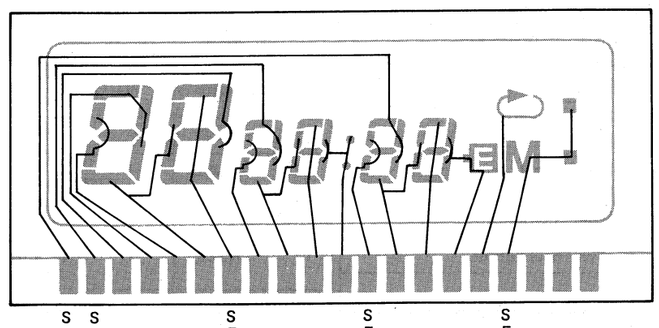
* Cover the parts boxed made of plastics with aluminum foil.
* Ground the soldering iron.
* Put a conductive mat on the work table.
* Do not touch the legs of IC or LSI with fingers directly.

■ INTERNAL CONNECTIONS OF LCD (Liquid crystal display)

• Common connection diagram



• Segment connection diagram



A MAIN CIRCUIT

OPTICAL PICKUP

SOAD100A

IC101 AN8373SE2 SERVO AMP

IC102 AN8374SE2 SERVO PROCESSOR

IC103 AN8387SE2 MOTOR DRIVE (TRAVERSE/SPINDLE)

IC104 AN8387SE2 COIL DRIVE (FOCUS/TRACKING)

IC105 NJM2406FTE1 LASER POWER DRIVE

IC202 MN6625 DIGITAL SIGNAL PROCESSOR

IC203 LC3517ML 16K RAM

Q109 2SB970QRSTW LASER POWER DRIVE

Q110 DTA124TKT97 LASER POWER DRIVE

Q201 2SD601QRSTW SWITCHING

Q202,203 DTA124TKT97 SWITCHING

SI02 REST DET. SWITCH

SI01 (LASER ON/OFF)

TP101 TP102 (S.GND) TP103 TP104 TP105 TP106 TP107 TP108

Focus offset adj.

Tracking offset adj.

Tracking gain adj.

Best eye adj.

Focus gain adj.

Tracking balance adj.

Short land

ACTUATOR: FOCUS COIL (FO-, FO+), TRACKING COIL (TR+, TR-)

TRAVERSE MOTOR

SPINDLE MOTOR

S207 (PLAY MODE) random ⟷ resume ⟷ normal

S206 (MEMORY RECALL) S205 (REPEAT) S208 (STOP/POWER OFF) S202 (F-SK(P)) S203 (F-SK(P)) S204 (R-SK(P))

D201~203 MA151WKTW

D205 MA151WATW

D206 MA151WATW

9 10 11 12 13 14 15 16 17 18

LCD201 (EDD042CA0A3P)

Q202,203 DTAI24TKT97 SWITCHING

Q201 2SD601QRSTW SWITCHING

IC201 MN15845PEQ SYSTEM CONTROL & LCD DRIVE

IC11 AN8083SE2 DC-DC CONVERTER CONTROL

Q21 2SB709QRSTW SWITCHING (RESET)

IC303 NJM2100MAT1 LINE AMP

Q308,312 DTC114TKT97 MUTING CONT./RESET

Q318 DTA114EKT97 MUTING CONT.

Q11,20 2SD1302STTA CONSTANT VOLTAGE

Q12 2SD1328STTW CONSTANT VOLTAGE

Q301,302 2SD1757KQSTW MUTING

Q25 2SB709QRSTW STABILIZER

Q26 2SD601QRSTW STABILIZER

Q303,304,315,316 2SD1757KQSTW MUTING

IC304 NJM3414MT1 HEADPHONES AMP

IC301 SM5807ESET DIGITAL FILTER

IC302 UPD6372GSE1 D/A CONVERTER

IC203 LC3517ML15T 16K RAM

Q310 DTA144TKT97 SWITCHING (DE-EMPHASIS)

Q305,306 FMG4T98 SWITCHING (RESET/DE-EMPHASIS)

Q317 DTC114TKT97 SWITCHING (RESET)

DC IN 3V

BATTERY 3V

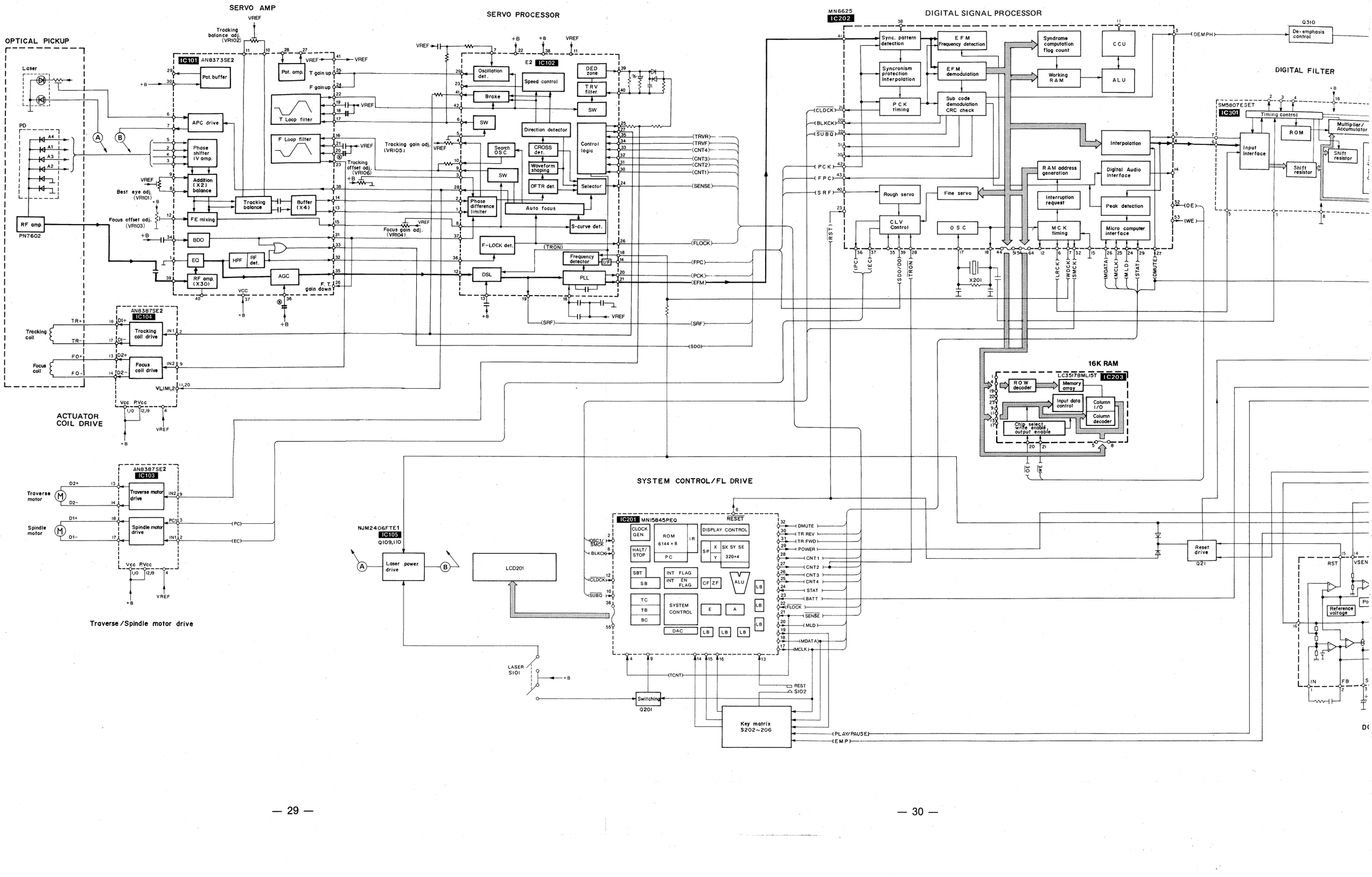
LINE OUT

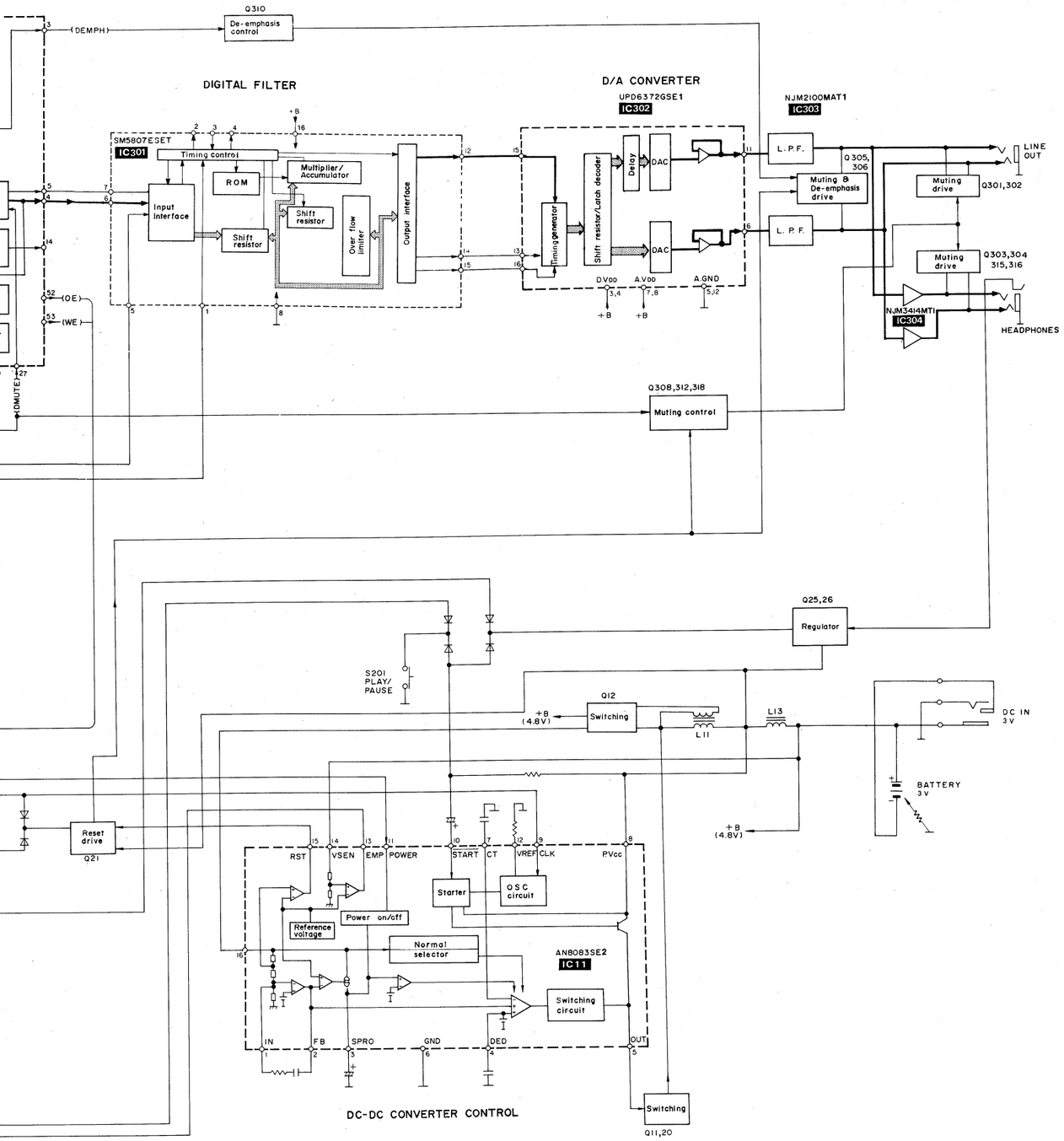
HEADPHONES

TP110 (D.GND)

TP109 (A.GND)

■ BLOCK DIAGRAM



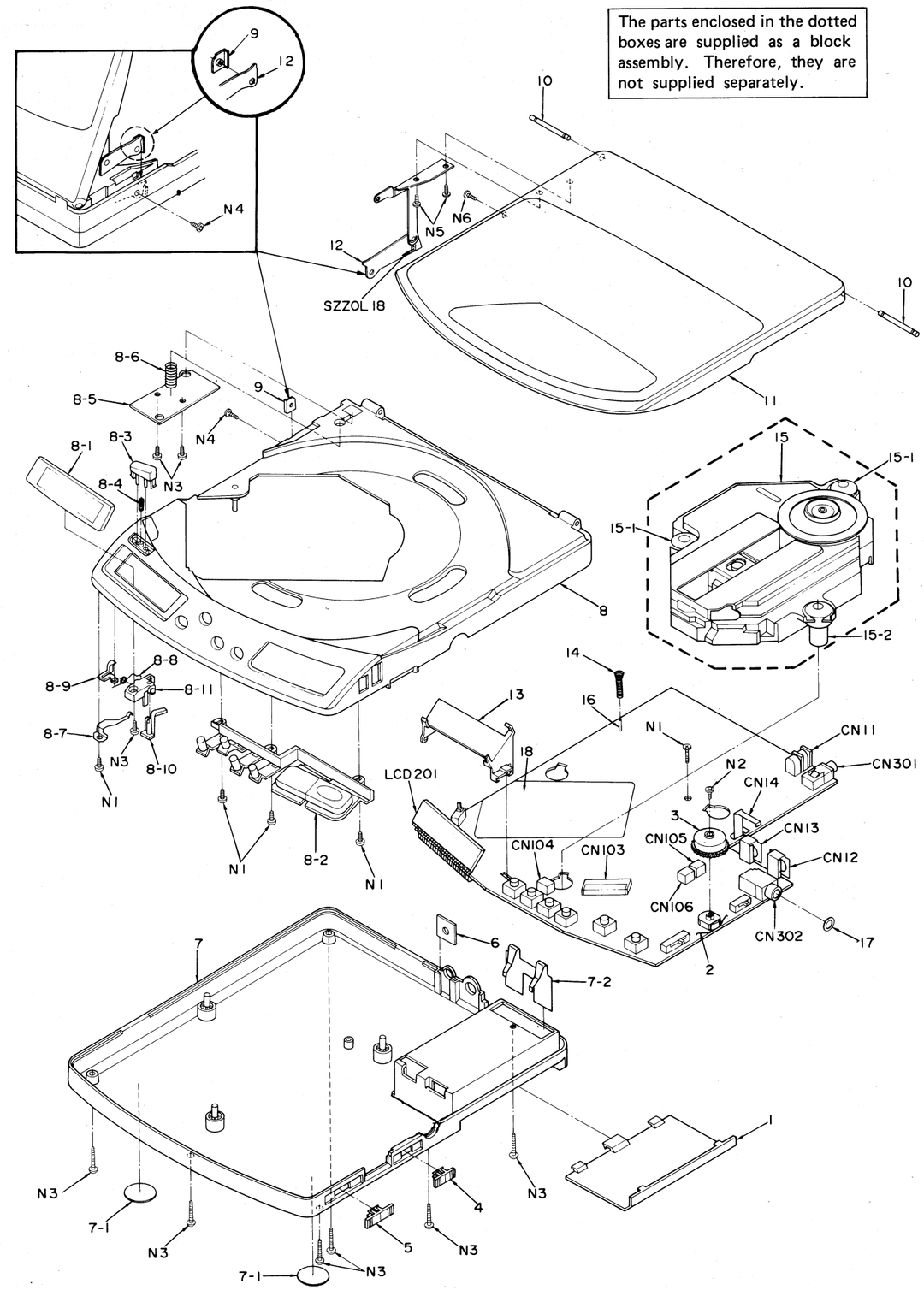


Note:

→ Audio signal

■ EXPLODED VIEW

The parts enclosed in the dotted boxes are supplied as a block assembly. Therefore, they are not supplied separately.



■ REPLACEMENT PARTS LIST

Notes : * Important safety notice:
Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
* The parenthesized indications in the Remarks columns specify the areas. (Refer to the cover page for area.)
Parts without these indications can be used for all areas.
* **Warning:** This product used a laser diode. Refer to caution statements on page 2.

Ref. No.	Part No.	Part Name & Description	Remarks
		CABINET AND CHASSIS	
1	RKK0009-1K	BATTERY COVER	
2	RME0044-1	EARTH SPRING	
3	SBND90ZKDA	KNOB (HP VOL)	
4	RGV0004-K	KNOB (XBS)	
5	RGV0005-K	KNOB (MODE)	
6	RMA0110	BRACKET (REAR)	
7	RFKJLXP2PC-K	BOTTOM CABINET ASS'Y	
7-1	SHGD54	FOOT	
7-2	RJC93001-1	BATTERY TERMINAL (COMMON)	
8	RYK0057-K	INTERMEDIATE CABINET ASS'Y	
8-1	RKW0036A	ORNAMENT (FRONT)	
8-2	RGU0125-K1	BUTTON (OPERATION)	
8-3	RGU0126-K2	BUTTON (OPEN)	
8-4	RMB0055-2	SPRING (BUTTON)	
8-5	RMA0188	SPRING HOLDER	
8-6	RMB0054-2	SPRING (KICK)	
8-7	RMC0027-1	SPRING (ACTION)	
8-8	RMC0028-2	SPRING (LEVER)	
8-9	RML0083-2	OPEN LEVER	
8-10	RMR0150-3	ACTION LEVER	
8-11	RMR0151-2	ACTION GUIDE	
9	RMA0112-1	STOPPER ANGLE	
10	RMS0105	SHAFT (DUST COVER)	
11	RFKKLXP2P-K	DUST COVER ASS'Y	
12	RXA0005-1	LINK ANGLE ASS'Y	
13	RJF0002-1	LED HOLDER	
14	RMB0124-1	COIL SPRING	
15	SODD100Z	TRAVERSE DECK UNIT	
15-1	SHGD157	RUBBER SPACER	
15-2	SHGD125	RUBBER SPACER	
16	RJP162ZA	PIN	
17	RHW66001	WASHER	
18	RMZ0050	COVER SHEET	
		SCREWS	
N1	XTN17+4J	SCREW	
N2	XQN17+C3FZ	SCREW	
N3	XTN17+6JFZ	SCREW	
N4	RHE5155YA	SCREW	
N5	RHE5068ZA	SCREW	
N6	RHE5097ZA	SCREW	
		ACCESSORI (ES)	

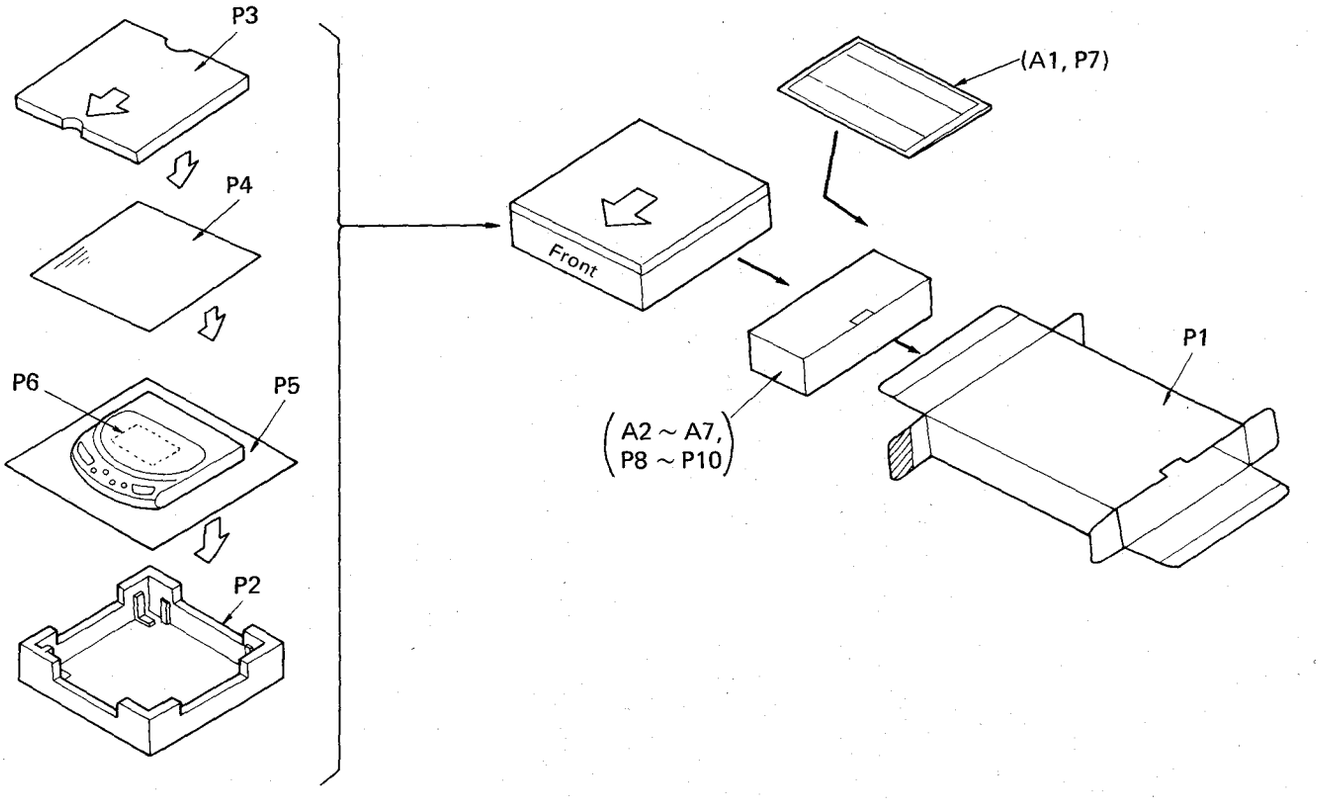
Ref. No.	Part No.	Part Name & Description	Remarks
A1	RQF0284	INSTRUCTION MANUAL	(E, EO)
A1	RQF0282	INSTRUCTION MANUAL	(EB)
A1	RQF0283	INSTRUCTION MANUAL	(EG)
A1	RQF0285	INSTRUCTION MANUAL	(GC, GN)
A2	RFC0005	STRAP	
A3	RFEV100A0ZS	STEREO EARPHONES	
A4	SH-CDA6U-E	AC ADAPTOR	(E, EG, EO) ⚠
A4	SH-CDA6U-EK	AC ADAPTOR	(EB) ⚠
A4	SH-CDA6U-XB	AC ADAPTOR	(GC) ⚠
A4	SH-CDA6U-XL	AC ADAPTOR	(GN) ⚠
A5	SH-CDB8-1	RECHARGEABLE BATTERY	
A6	SJPD5-2K	STEREO CONNECTION CABLE	
A7	RJP120ZDS-K	AC PLUG ADAPTOR	(GC)
		PACKING MATERIAL (S)	
P1	RPK0078	PACKING CASE	
P2	RPN0213	PAD (BOTTOM)	
P3	RPN0214-1	PAD (TOP)	
P4	RPH0035-1	MIRROR SHEET	
P5	RPH0036-1	POLYETHLENE SHEET	
P6	SPSD14	PROTECTION SHEET	
P7	RPF0046	PROTECTION BAG	
P8	RPQ0054	PAD	(E, EG, EO)
P8	RPQ0069	PAD	(EB, GC)
P8	RPQ0070	PAD	(GN)
P9	RPQ0059	SPACER	(E, EG, EO, GN)
P10	RPQ0065	ACCESSORIES CASE	

Ref. No.	Part No.	Part Name & Description	Remarks
		INTEGRATED CIRCUIT(S)	
IC11	AN8083SE2	IC, DC-DC CONV. CONT.	
IC101	AN8373SE2	IC, SERVO AMP	
IC102	AN8374SE2	IC, SERVO PROCESSOR	
IC103, 104	AN8387SE2	IC, MOTOR/COIL DRIVE	
IC105	NJM2406FTE1	IC, LASER POWER DRIVE	
IC201	MN15845PEQ	IC, SYSTEM CONT. &LCD DRIVE	
IC202	MN6625	IC, DIGITAL SIGNAL PROCESSOR	
IC203	LC3517BML15T	IC, 16K RAM	
IC301	SM5807ESET	IC, DIGITAL FILTER	
IC302	UPD6372GSE1	IC, D/A CONVERTER	
IC303	NJM2100MAT1	IC, LINE AMP	
IC304	NJM3414MT1	IC, HEADPHONES AMP	
ICP11	SRUN38T	IC, PROTECTOR	
		TRANSISTOR(S)	
Q11	2SD1302STTA	TRANSISTOR	
Q12	2SD1328STTW	TRANSISTOR	
Q20	2SD1302STTA	TRANSISTOR	
Q21	2SB709QRSTW	TRANSISTOR	
Q25	2SB709QRSTW	TRANSISTOR	
Q26	2SD601QRSTW	TRANSISTOR	
Q109	2SB970QRSTW	TRANSISTOR	
Q110	DTA124TKT97	TRANSISTOR	
Q201	2SD601QRSTW	TRANSISTOR	
Q202, 203	DTA124TKT97	TRANSISTOR	
Q301, 302	2SD1757KQSTW	TRANSISTOR	
Q303, 304	2SD1757KQSTW	TRANSISTOR	
Q305, 306	FMG4T98	TRANSISTOR	
Q308	DTC114TKT97	TRANSISTOR	
Q310	DTA144TKT97	TRANSISTOR	
Q312	DTC114TKT97	TRANSISTOR	
Q315, 316	2SD1757KQSTW	TRANSISTOR	
Q317	DTC114TKT97	TRANSISTOR	
Q318	DTA114EKT97	TRANSISTOR	
		DIODE(S)	
D11, 12	MA151WKTW	DIODE	
D13	MA151WKTW	DIODE	
D14	MA153TW	DIODE	
D15	MA151WKTW	DIODE	
D105	MA151WATW	DIODE	
D106	MA153TW	DIODE	

Ref. No.	Part No.	Part Name & Description	Remarks
D107	MA721TW	DIODE	
D108	MA151A	DIODE	
D109	MA721TW	DIODE	
D201, 202	MA151WKTW	DIODE	
D203	MA151WKTW	DIODE	
D205	MA151WKTW	DIODE	
D206	MA151WATW	DIODE	
		VARIABLE RESISTOR(S)	
VR101	EVNDXAA00B14	V. R, BEST EYE ADJ.	
VR102	EVNDXAA00B24	V. R, TRACKING BALANCE ADJ.	
VR103	EVNDXAA00B14	V. R, FOCUS OFFSET ADJ.	
VR104	EVNDXAA00B14	V. R, FOCUS GAIN ADJ.	
VR105	EVNDXAA00B14	V. R, TRACKING GAIN ADJ.	
VR106	EVNDXAA00B14	V. R, TRACKING OFFSET ADJ.	
VR301	EVUBPAT50C54	V. R, HEADPHONES	
		COIL(S)	
L11	RLZ0002	COIL	
L13	RLQZ330K-K	COIL	
L102	RLQB471K-K	COIL	
L302	BL03RN2-R62	COIL	(EG)
		OSCILLATOR(S)	
X201	RSXZ16M9M01T	OSCILLATOR	
		CHIP JUMPER(S)	
J11, 12	ERJ6GEY0R00V	CHIP JUMPER	
J13, 14	ERJ6GEY0R00V	CHIP JUMPER	
J15, 16	ERJ6GEY0R00V	CHIP JUMPER	
J17	ERJ8GEY0R00V	CHIP JUMPER	
		JACK(S) & CONNECTOR(S)	
CN11	RJJ4301	DC IN JACK	
CN12, 13	RJC30002-1	BATERY TERMINAL	
CN14	RJH5101-1	TERMINAL	
CN103	RJU035T016	CONNECTOR (35P)	
CN104, 105	EMCS0255B	CONNECTOR	
CN106	EMCS0255B	CONNECTOR	
CN301	RJJD3S5ZA-C	LINEOUT JACK	
CN302	RJJD5S3MZA-C	HEADPHONES JACK	
		DISPLAY	

Ref. No.	Part No.	Part Name & Description	Remarks
LCD201	EDD042CA0A3P	LCD TUBE	
		SWITCH(ES)	
S101	RSH1A91ZA-A	SW, LASER ON/OFF	
S102	SSHD5	SW, REST DET	
S201	EVQQTJ04M	SW, PLAY/PAUSE	
S202	EVQQTJ04M	SW, STOP/POWER OFF	
S203	EVQQTJ04M	SW, F. SKIP/SEARCH	
S204	EVQQTJ04M	SW, R. SKIP/SEARCH	
S205	EVQQTJ04M	SW, REPEAT	
S206	EVQQTJ04M	SW, MEMORY/RECALL	
S207	ESD11H230	SW, PLAY MODE SELECTOR	
S301	ESD11H220	SW, XBS	

■ PACKING



■ RESISTORS & CAPACITORS

Notes : * Capacity valuse are in microfarads (uF) unless specified otherwise, P=Pico-farads (pF) F=Farads (F)
* Resistance values are in ohms, unless specified otherwise, 1K=1,000 (OHM) , 1M=1,000k (OHM)

Ref. No.	Part No.	Values & Remarks
		RESISTORS
R14	ERJ6GEYJ100V	1/10W 10
R16	ERJ6GEYJ333V	1/10W 33K
R19	ERJ6GEYJ105V	1/10W 1M
R28, 29	ERJ6GEYJ220V	1/10W 22
R31	SRR06J6R8TNR	1W 6.8
R36	ERJ6GEYJ221V	1/10W 220
R39, 40	ERJ6GEYJ105V	1/10W 1M
R101, 102	ERJ6GEYJ183V	1/10W 18K
R105	ERJ6GEYJ105V	1/10W 1M
R109	ERJ6GEYJ153V	1/10W 15K
R114	ERJ6GEYJ223V	1/10W 22K
R115	ERJ6GEYJ684V	1/10W 680K
R118	ERJ6GEYJ123V	1/10W 12K
R119	ERJ6GEYJ154V	1/10W 150K
R120	ERJ6GEYJ683V	1/10W 68K
R135	ERJ6GEYJ221V	1/10W 220
R136	ERJ6GEYJ220V	1/10W 22
R139	ERJ6GEYJ223V	1/10W 22K
R142	ERJ6GEYJ100V	1/10W 10
R145	ERJ6GEYK4R7V	1/10W 4.7
R208	ERJ6GEYJ105V	1/10W 1M
R319, 320	ERJ6GEYJ821V	1/10W 820
R328	ERJ6GEYJ123V	1/10W 12K
R329	ERJ6GEYJ154V	1/10W 150K
R331, 332	ERJ6GEYJ120V	1/10W 12
R335	ERJ6GEYJ821V	1/10W 820
R349, 350	ERJ6GEYJ471V	1/10W 470
R352	ERJ6GEYK2R2V	1/10W 2.2
R355, 356	ERJ6GEYJ100V	1/10W 10
R359, 360	ERJ6GEYJ105V	1/10W 1M
R367	ERJ6GEYJ821V	1/10W 820
R368, 369	ERJ6GEYJ561V	1/10W 560
		CAPACITOR(S)
C11, 12	ECEA1AK470I	10V 47U
C13	SRX01C470GNJ	16V 47U
C14	ECEA0JK101I	6.3V 100U
C15	ECUV1C105ZFM	16V 1U
C16	ECUV1E103KBN	25V 0.01U
C17	ECEA1EK4R7I	25V 4.7U
C18	ECUV1H102KBN	50V 1000P
C19	ECUV1E103KBN	25V 0.01U
C20	ECEA1EK4R7I	25V 4.7U
C21	ECUV1C104KBM	16V 0.1U
C22	ECUV1H331KBN	50V 330P
C23	ECUV1H470KC	50V 47P
C24	ECUV1C104ZFN	16V 0.1U
C101	ECUV1C823KBM	16V 0.082U
C102	ECEA1HKN010I	50V 1U
C103	ECUV1C333KBN	16V 0.033U
C104	ECEA1HKN010I	50V 1U
C105	ECUV1C333KBN	16V 0.033U
C106	ECEA1HK010I	50V 1U
C107	ECUV1H102KBN	50V 1000P
C108	ECUV1H681KB	50V 680P
C109	ECKR1H181KB5	50V 180P
C110	ECUV1C104ZFN	16V 0.1U
C112	ECUV1C104KBM	16V 0.1U
C113	ECUV1C223KBN	16V 0.022U
C114	ECUV1C563KBM	16V 0.056U
C115	ECEA0JK220I	6.3V 22U
C116	ECUV1E473KBN	25V 0.047U
C117, 118	ECUV1C224KB	16V 0.22U
C119	ECEA1HKN2R2I	50V 2.2U
C120	ECUV1C223KBN	16V 0.022U
C122	ECUV1C104ZFN	16V 0.1U
C124	ECEA1HKR47I	50V 0.47U
C125	ECUV1C104ZFN	16V 0.1U
C133	ECUV1H680KC	50V 68P
C134	ECUV1H681KB	50V 680P
C135	ECUV1C104KBM	16V 0.1U
C136	ECEA1HK2R2I	50V 2.2U
C137	SRX01B470GNJ	10V 47U
C141	ECEA0JK470I	6.3V 47U
C142	ECEA1CK100I	16V 10U
C148	ECUV1E103KBN	25V 0.01U
C149	ECUV1H222KBN	50V 2200P
C150	ECUV1C104ZFN	16V 0.1U
C151	ECUV1E393KBN	25V 0.039U
C201	ECEA1HK010I	50V 1U
C202	ECUV1C104ZFN	16V 0.1U
C203	ECUV1H270KCN	50V 27P
C204	ECUV1H390KCN	50V 39P
C205	ECUV1C104ZFN	16V 0.1U
C207	ECUV1H102KBN	50V 1000P
C208, 209	ECUV1H070DCM	50V 7P
C304	ECEA0JPK101I	6.3V 100U
C309, 310	ECUV1C223KBN	16V 0.022U
C311, 312	ECUV1H222KBN	50V 2200P
C313	ECEA0JPK220I	6.3V 22U
C321, 322	ECEA1APK330I	10V 33U
C329, 330	ECEA0GPK221I	4V 220U
C333, 334	ECUV1C104ZFN	16V 0.1U
C335, 336	ECUV1H681KB	50V 680P
C337, 338	ECUV1E123KBN	25V 0.012U
C340	ECEA0JK101I	6.3V 100U
C343	ECUV1C104ZFN	16V 0.1U
C344	ECEA0JKS331I	6.3V 330U
C346, 347	ECEA1CPK100I	16V 10U
C348	ECEA1HK010I	50V 1U
C349, 350	ECUV1H102KBN	50V 1000P
C351	ECFF1E104ZF5	25V 0.1U (EG)

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